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SUN-CRACKING OF Vulcanized Rubber[1]

B. B. EVANS

FOLLOWING a cursory review of published information on the deteriorating action of light and oxygen, the author describes his research on this subject as follows:

The experimental work now to be dealt with had as its broad objects the study of sun-cracking influenced by difference in fillers, methods of preparation or manufacture, and conditions of exposure.

Three series of mixes were used: (1) Rubber 100 parts by weight, sulphur 8 parts by weight, filler 20 per cent by volume on the rubber. (2) As series (1) but containing 1 per cent by volume of carbon black to color the batch. This series was included in view of the contradictory statements in the literature regarding the relative behavior of light and dark colored stocks. (3) Rubber 100, sulphur 4, zinc oxide 2, D.P.G. 1, parts by weight, and filler 20 per cent by volume on the rubber.

The fillers used were zinc oxide, china clay, and light magnesium carbonate. The last two were chosen as fillers which impart a laminated or "grain" effect to the rubber.

The batches were calendered to about 1/10-inch thickness, samples of each being cured in chalk and in a daylight press. The object of this was to see whether cracking developed less quickly on the smooth molded samples than on the more uneven calendered surfaces.

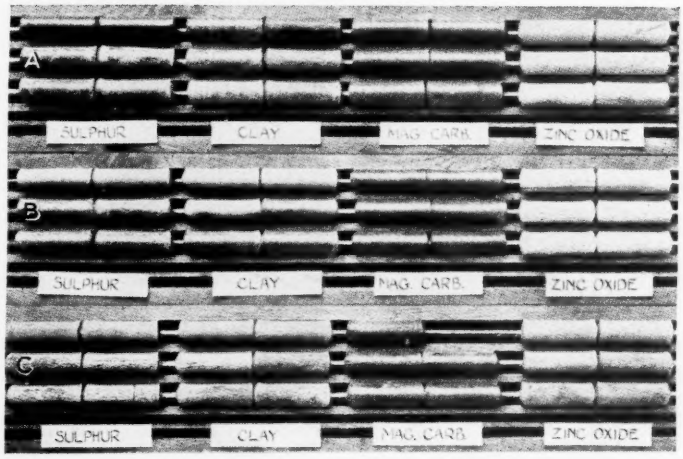


Fig. 1. Group A. Rubber 100; Sulphur 4; Zinc Oxide 2; DPG 1; Filler 20 Per Cent by Volume on Rubber. Group B. Rubber 100; Sulphur 8; Filler 20 Per Cent by Volume on Rubber. Group C. Rubber 100; Sulphur 8; Carbon Black 1; Filler 20 Per Cent by Volume on Rubber.

Round disks were cut from each sample, and two specimens were bent practically double in suitable wooden frames. Sets of samples were exposed, as follows: (1) In the open facing south for four months. (2) Indoors near the window facing south for four months. (3) To a mercury vapor lamp continuously for one week. A jet of air was directed across the surface of the latter samples to keep them cool.

Figure 1 shows the samples after six weeks' exposure in the open during the spring. In each case the top row consists of the press cured samples bent across the calender grain, the second row of chalk cured samples similarly bent, and the third row similar samples bent along the grain.

The following observations may be made on the specimens:

Effect of different compounding ingredients. In the two untinted series there is little difference between the pure stock and that containing zinc oxide, and both of these are inferior to the mixes containing clay and magnesia carbonate. The superiority of these two may be bound up in their optical properties, and in the case of magnesium carbonate there is also the possibility that owing to the comparatively high "set" induced by this filler, the samples would be under less strain.

Influence of carbon black. It will be seen that the effect of adding 1 per cent carbon black is marked, and the in-

[1]Abstract of paper read at a meeting of the London and District Section of the Institution of the Rubber Industry. Published in *IRI Transactions*, April, 1930, pp. 442-50.

crease is very definite in the amount of cracking produced in the "pure" and clay stocks. The latter is now as bad as, or a little worse than, the corresponding zinc oxide batch. The increase in cracking in the case of the magnesium carbonate stock is not so great but is nevertheless definite.

The result is in agreement with that of Shepard and his colleagues, but is contrary to that obtained by the Bureau of Standards. The explanation of the different results is not obvious but may lie in the different types of mix used or in a variation in the carbon blacks. It has been shown, for instance, by Cox and Park[2] that carbon blacks vary appreciably in their effects on the aging properties of rubber.

Effect of calender grain. In view of the well-recognized difference which exists between the physical properties along and across a vulcanized calendered sheet due to the alinement of the filler, it seemed not unreasonable to suppose that this difference in physical structure might be reflected in a difference in the form of cracking along and across the grain, and that cracking would proceed more easily along the grain than across it. It will be seen from Figure 1 that cracking for the most part takes place at right angles to the direction of mechanical strain, and in the top two rows of each set of samples, automatically follows the grain. Where samples are bent along the grain, cracking still proceeds mainly at right angles to the direction of mechanical strain and only a small amount of cracking proceeds along the grain of the sheet. The clay stock appears to be most susceptible to such tendency as there is for this to happen; though even here it does not influence materially the cracking, which appears to depend almost entirely on the mechanical strain imposed on the sample.

Effect of accelerating the cure. As diphenylguanidine has no antioxidant action, any differences observed between the accelerated and unaccelerated batches would be due to differences in sulphur content, length of cure, or a combination of both. At the end of six weeks, only the rubber sulphur and the zinc oxide stocks were showing any cracking. The accelerated batches were a little better than the unaccelerated ones, but it is doubtful if the difference was sufficiently large to be of practical importance.

Effect of different forms of surface. Generally speaking samples cured so that they have retained any slight irregularities of surface resulting from the calendering, are somewhat more cracked than the corresponding samples which have been cured to produce a smoother surface. This will be seen most easily in the colored batches where cracking is more advanced. (The magnesium carbonate stock is somewhat anomalous in that the press cured sample is worse than that cured in the pan. There is no obvious explanation for this.) It will be appreciated, therefore, that the production of as smooth a surface as possible, where articles are of such a nature that they are likely to be exposed to sunlight, etc., is a step in the right direction, technically, as well as being an aid to sales.

Figures 2, 3, and 4 show the three series of samples after four months' natural exposure outside and indoors and also after one week's exposure to a mercury vapor lamp. The arrangement of the samples is as previously detailed.

It will be seen that the slow curing zinc oxide stock is still worse than those containing clay or magnesium carbonate, under all conditions of exposure.

The colored batches are also, generally speaking, worse than the corresponding uncolored ones, and in the colored series the clay and magnesium carbonate stocks are, if anything, worse than the corresponding one containing zinc oxide. The different form which the cracking assumes in the case of the two former is presumably related to the particle shape of the fillers.

The small differences observed in Figure 1 arising from the alinement of the fillers have now disappeared, and

[2] *Ind. Eng. Chem.*, 1928, 20, 1088.

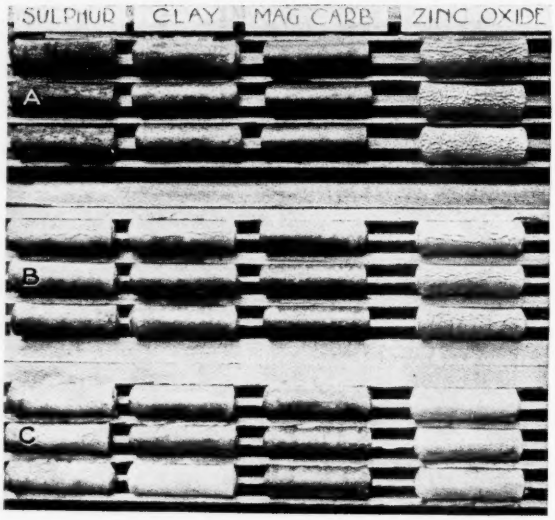


Fig. 2. Rubber 100; Sulphur 8; Filler 20 Per Cent by Volume on Rubber.

Group A. Exposed in Open Facing South. Group B. Exposed in Laboratory Facing South. Group C. Exposed to Ultra-Violet Lamp for One Week.

under none of the conditions of exposure does any practical difference arise from the grain of the samples.

It is difficult to generalize on the question of accelerated and unaccelerated batches. So far as the rubber sulphur batch is concerned, there is little difference. In the clay series the accelerated batch is possibly a little better. In the one containing magnesium carbonate there is an indication that the reverse is the case; while with the zinc oxide batch the behavior appears to vary with the conditions of exposure. The experiments indicate that, broadly speaking, diphenylguanidine has little influence from a practical point of view, in either accelerating or retarding sun-cracking.

In the more prolonged tests the effect of different forms of surface has practically disappeared, especially in the series exposed outdoors, except in the tinted clay batch.

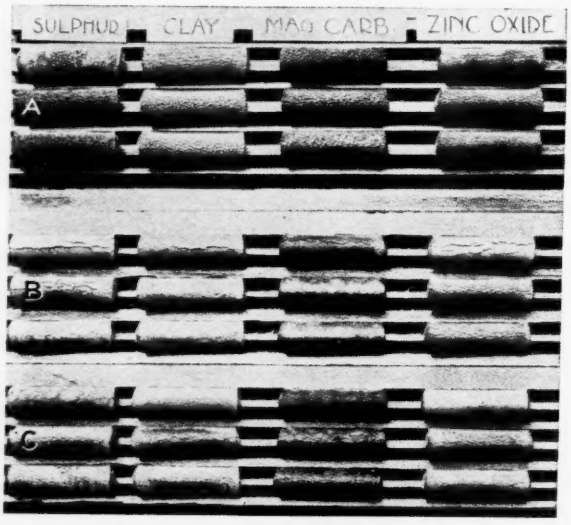


Fig. 3. Rubber 100; Sulphur 8; Carbon Black 1; Filler 20 Per Cent by Volume on Rubber.

Group A. Exposed in Open Facing South. Group B. Exposed in Laboratory Facing South. Group C. Exposed to Ultra-Violet Lamp for One Week.

In the indoor series, in the case of the rubber sulphur and the zinc oxide stocks, the cracking is somewhat worse in the samples prepared direct from the calendered sheet. The difference is less marked in the other two mixes where there is a suggestion that the opposite is the case. No appreciable difference was detected between chalk cured and molded samples under ultra-violet-light exposure.

As is well recognized, outdoor exposure has been more severe than indoor exposure under glass. The former treatment produces a large number of comparatively short cracks, which in some cases join to form larger ones. Indoor exposure, on the other hand, produces a comparatively small number of long cracks. The more severe attack by outdoor exposure is probably due to a number of factors, among which are the non-removal of the active short waves of light, the free circulation of air with constant renewal of oxygen at the surface of the samples, and the greater tendency for the removal of sulphur bloom which has been stated to have a protective action.

The question may now be asked as to how far, in the present experiments, exposure to a mercury vapor lamp has corresponded with natural aging conditions.

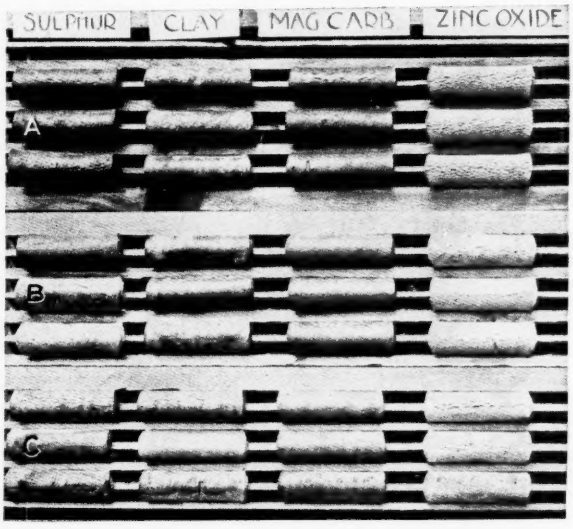


Fig. 4. Rubber 100; Sulphur 4; Zinc Oxide 2; DPG 1; Filler 20 Per Cent by Volume on Rubber.

Group A. Exposed in Open Facing South. Group B. Exposed in Laboratory Facing South. Group C. Exposed to Ultra-Violet Lamp for One Week.

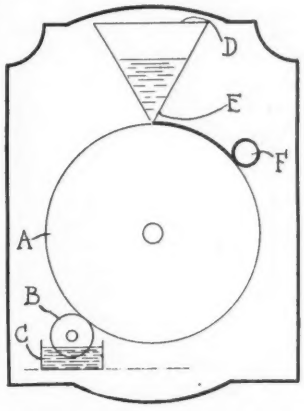
In the first place the cracks produced by the mercury-vapor lamp are numerous and small and in appearance are closer to those produced by outdoor exposure than to those resulting from exposure indoors. Also the lamp produced worse cracking in the rubber sulphur and the zinc oxide batches than in the other two in both the accelerated and unaccelerated series; and as can be seen fairly easily from Figures 2 and 3, worse cracking has been produced in the colored stocks than in the corresponding untinted ones. In these respects, therefore, where appreciable differences were found in practice, exposure to the lamp was qualitatively in line with natural exposure, though in both cases the differences found in the lamp test were smaller than the corresponding differences found in practice. Where much smaller differences were found under natural conditions, for example, with accelerated and unaccelerated batches, orientation of filler and of different forms of surface, little or no difference was found in the lamp test. This latter evidence is possibly of a negative character.

From the present experiments it would appear that with certain types of mix, exposure to the mercury vapor lamp will enable one to predict appreciable differences in resistance to sun-cracking which are likely to be found in practice. However, experience with a wide range of mixes is probably necessary before the test can be applied indiscriminately. It will be appreciated, also, that as natural conditions in England are by no means standard, the test is likely, at best, to be only qualitative.

Goods from Compounded Latex

A NEW technology of rubber is in development, evidenced by the patented rubber working process relating to water dispersions of crude and reclaimed rubber, electrodeposition of rubber, latex compounding, and the production of rubber articles direct from latex.

One of the recently patented new processes has particular reference to method of manufacturing such articles by the coagulation of rubber from suspensions or emulsions such as latex, thereby obviating the necessity of subjecting the rubber to the conventional process of plastication and compounding upon a mill. According to this method[1] an emulsion of rubber containing the requisite compounding ingredients is spread upon a suitable form, preferably, though not necessarily, in a partially coagulated state and is there subjected to complete coagulation by some convenient means. For example in order to manufacture an inner tube an apparatus outlined in the accompanying illustration may be used.



Making Inner Tubes from Compounded Latex

This apparatus comprises a rotatably driven cylinder or drum *A*, the outer surface of which is constantly moistened with a rubber precipitant by means of a roller *B* which dips into a solution of the precipitant contained in the trough *C*. Latex containing the proper compounding ingredients is stored in the hopper-like tank *D* above the drum. From this tank it escapes to the surface of the drum through a narrow slit *E* at the bottom of the tank. The film of latex is coagulated to a thin sheet of rubber by the liquid precipitant transferred to the surface of *A* and is removed from the drum by winding it upon a mandrel *F*, thereby building up an inner tube of desired thickness of wall.

The latex may be compounded as follows:

	Parts
Rubber contained in concentrated latex	100
Zinc oxide	5
Sulphur	3
Mercapto benzothiazole	1
	109

The zinc oxide, sulphur, and accelerator are preferably ground together with a little ammonia to form a paste, which does not coagulate the latex upon being added to it. Articles formed of this compound may be cured by being heated one hour at 228° F. at 20 pounds' steam.

Practice of this invention permits the incorporation of the sulphur and other compounding materials into the rubber with the minimum expenditure of power and time. These ingredients are distributed uniformly through the rubber. Furthermore, the natural antioxidants and accelerators present in the latex appear to remain in the rubber.

[1] U. S. Patent No. 1,757,928, May 6, 1930.

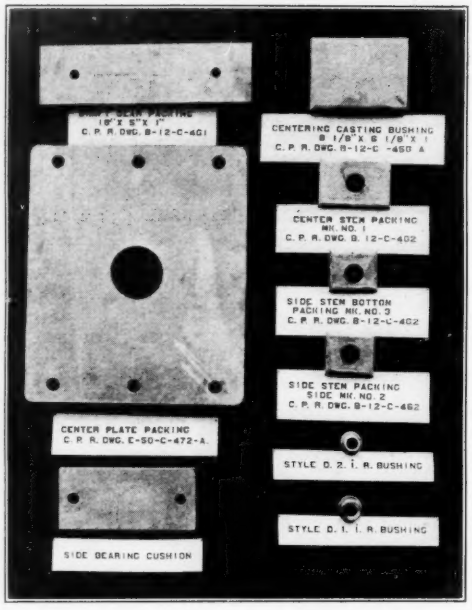
Rubber Shock Absorbers

Passenger Cars of C. P. Ry. Co. Protected from Shock and Noise by Rubber

PADS of rubber have been applied under all the passenger equipment constructed during the year by the Canadian Pacific Railway Co. The rubber thus being used is a specially made composition of British manufacture by a company that has been producing rubber goods for similar purposes for many years.

Externally these rubbers have the appearance of solid pads as shown in the picture. For some locations, however, the rubber is molded through perforated steel plates to restrain the extent of its deformation in service and also to permit the use of a saw tooth or corrugated form of pad when such construction is desirable.

The policy in this use of rubber is to insulate the car body from the car trucks. Therefore these pads are used under the center plate and side bearings. Bushings or ferrules of rubber are used on the center plate bolts so that the entire car body is completely insulated from the trucks, and every noise due to the wheels running over rail joints, switches, etc., is actually deadened through absorption by the rubber. In addition the heavy shocks are similarly reduced by the rubber insulation.


CENTERING CASTING BUSHING
CENTER STEM PACKING
SIDE STEM BOTTON PACKING MK. NO. 3
SIDE STEM PACKING SIDE MK. NO. 2
CENTER PLATE PACKING
STYLE D. 2. I. R. BUSHING
STYLE D. 1. I. R. BUSHING
SIDE BEARING CUSHION

Rubber Pads for C. P. R. Passenger Cars

In order to minimize the noise at the point of origin rubber pads are used around the buffing gear stem and coupler shank. This location between cars is one very difficult to keep quiet owing to the car motion or the swaying action.

Experience thus far with the equipment indicates that the use of rubber for silencing and shock absorption is decidedly efficient for the purpose. It is proposed to extend its use still further to improve the riding qualities of car equipment of the road to the fullest extent.

The rolling stock, which will be fully equipped with rubber sound and shock deadening pads during the present year, includes 50 sleeping cars, 14 parlor cars, 2 overnight sleepers, 8 dining cars, 5 Glen compartment cars, 7 smoking cars, and 13 day coaches of the first class. H. B. Bowen is chief of motive power and rolling stock division.

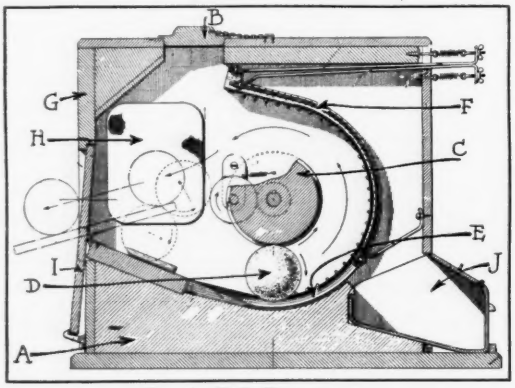
Reconditioning Tennis Balls

Restoring the Playing Qualities of Used Balls

IT IS well known that tennis balls after being used are discarded because the nap of the ball has worn smooth. Three balls as a rule is the minimum number used in a set of tennis. When these are replaced by new balls at every two or three sets, the game becomes rather expensive. The rejected balls are said to be "light" when in fact they have lost less than three per cent in actual weight. However, they are smooth and their friction against the air has been diminished. Restoration of the roughness of the surface and its white color completely restores the playing qualities of the ball.

The purpose of a relatively rough surface on a tennis ball is first to provide the proper frictional engagement of the ball with the racket, and second to increase slightly the frictional resistance between the ball and the air as the ball passes through it. The first is necessary in order that the ball may be given any desired twist or spin and the second in order that the spin or twist given the ball may be effective in causing it to travel in a curved path.

The mechanism used for restoring tennis balls to serviceable condition is indicated in vertical section by the illustration. The device[1] comprises a housing or box *A*—with a ball entrance *B* and containing a drum *C*, the revolutions of which cause the balls *D* to travel upward and around the drum in two resiliently supported parallel tracks *E*. The latter are spaced sufficiently so that the balls in their passage contact with a needle belt *F* lying between them, which serves to raise a nap on their surfaces. The balls are deflected in their revolving and spinning motion by contact with surfaces *G* and *H*.



Tennis Ball Renovator

During the renapping operation the balls are whitened by absorbing more or less of powdered chalk placed in the apparatus with them. After treatment the balls are removed at the door *I*. The lint and surplus chalk are received in the container *J* and removed when necessary.

[1]United States Patent No. 1,766,198.

Rubber Power Transmission Belting—I[1]

The Materials and the Construction of Rubber Belting

W. L. STURTEVANT[2]

CHARLES GOODYEAR, inventor of hot vulcanization of rubber with sulphur, is authority for the statement, "Machine belting was one of the first manufactures of india rubber in the United States. It was manufactured to a considerable extent by the Roxbury Company as early as 1836. The gum was used upon the inside only as a cement for holding the different layers of canvas together."[3] Although that crudely constructed belting "was found to answer tolerably," it certainly would fail to meet present-day power transmission requirements. Conveyer and elevator beltings are special types of much more recent development. Attention is here restricted to the construction and testing of rubber belting for power transmission.

Materials and Construction

Rubber transmission belting of many grades is made in widths from 1 to 72 inches and from 2 to 14 plies, according to the pulley sizes and other service requirements. The adhesiveness of rubber belting, as well as its high tensile strength and flexibility, qualifies it as a most efficient means for transmission of power. It is possible, by proper manufacturing control, to assure uniformity of these factors which are essential to high standard performance. The low initial cost and long service rendered by rubber belting make it most economical for use in power transmission.

Belting ducks are made to specifications, vary in strength and construction, and are classified according to weight. If a section of fabric 36 by 42 inches weighs 32 ounces, it is then described as 32-ounce duck. The usual weights of belting ducks are 28, 30, 33, and 36 ounces.

More 32-ounce fabric is used in rubber belting than any other weight, although certain special constructions, known as Silver Duck, and the heavier 36-ounce are used in considerable amounts.

Power Belting Construction

The first step in the preparation of belting duck for belt-making is to free it from moisture before applying to it a coating of adhesive rubber composition or the "friction" which functions as the adhesive binder to hold the plies together in the finally vulcanized construction.

Two methods recognized for testing duck are the grab and the strip methods[4], summarized as follows:

	Method	
	Strip	Grab
Length of specimens	7 in.	6 in.
Width of specimens	1½* in.	4 in.
Raveled to standard or specified threads per inch	1	..
Minimum width of bottom or back jaws	1½ in.	2 in.
Minimum width of top or front jaws	1½ in.	1 in.
Distance between jaws	3 in.	3 in.
Speed of pulling jaw per minute	12 in.	12 in.
Number of specimens each, warp and fillings	5	5

*If thread count is less than 50 per inch.

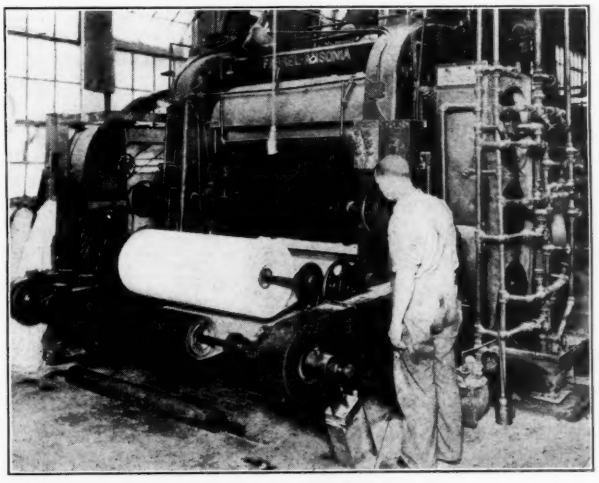
An 800-pound capacity test machine of the type pictured is used and the fabric conditioned at least 8 hours in air having a relative humidity of 65 per cent at 70° F.

The grab method yields 35 per cent higher tensile in the warp and 18 per cent higher tensile in the filling than the strip method because of cloth assistance during test, which is not present in the strip method. The strength of fabric increases, when it is frictioned, and increases when it is cured. The gain in strength is probably caused in the first instance by an increase in weight and by the fact that the rubber compound is forced between the fibers of the fabric, binding them together and bracing them by strut action. When the fabric is vulcanized, strength is gained by the physical changes in the rubber compound.

From Table I it will be noted that as the time of humidification increases, the amount of moisture absorbed increases with little appreciable increase in strength.

Humidification of 4 hours seems sufficient for standard conditioning of samples before testing their strength.

Duck tested and accepted for belt making must be suitably dried as a prerequisite to the friction process, the penetration of the fabric structure with adhesive rubber composition, the object of which is to bind together the duck plies in the belting and give the composite vulcanized article ability long to endure flexing in service without failure by ply separation.



Friction Calender

Fabric Drier

The fabric drier commonly used is the plate or cell type with ten steam

[1]Thesis submitted to the University of Maine in connection with graduate work for a degree in engineering.

[2]Chief chemist, Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J.

[3]"The Applications and Uses of Vulcanized Gum-Elastic with Descriptions and Directions for Manufacturing Purposes," Vol. II. By Charles Goodyear, New Haven, Conn., 1853.

[4]A. S. T. M. Specifications and Methods of Test for Textile Materials, 1927. Standard General Methods of Testing Woven Textile Fabrics, Serial Designation D-39-27.

drying plates. It is operated at a maximum speed of 20 yards a minute. Plates are each 2 yards long, and since 2 plies of fabric are between them, the fabric passing is in the drier a minimum of 2 minutes. One passage through the drier is generally sufficient. The plates are heated with 20 pounds of steam (258.5° F.), but radiation reduces the temperature of the surfaces to the range 237° F. to 250° F. The heat of the duck ranges 215° F. to 220° F.

TABLE I
EFFECT OF HUMIDITY ON THE STRENGTH OF BELTING DUCK

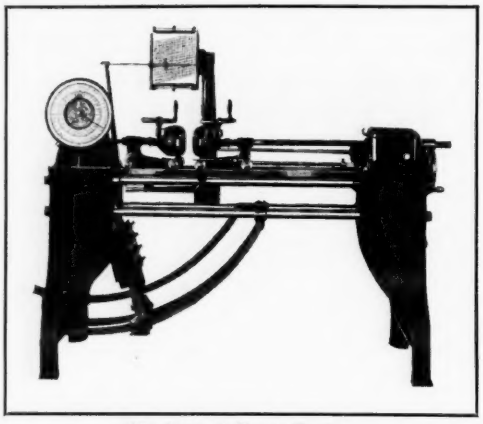
Hours of Humidification	Per Cent Average Relative Humidity	Average Temp. F.	Per Cent Moisture Regain	Tensile Strength—Pounds per Inch Wide, Warp and Filling 32-Ounce W.	32-Ounce F.	36-Ounce W.	36-Ounce F.
4	65.0	71	7.80	555	307	589	317
8	66.6	72	7.94	546	315	583	319
12	68.0	77	7.96	555	308	594	315
16	67.0	76	7.97	572	310	583	312
20	67.0	72	8.06	580	315	586	322
24	66.0	70	8.12	578	315	595	324

Duck stored for any considerable time loses some moisture, varying with the storage conditions. Duck from storage seems to lose a greater percentage from its marked weight on being run through the drier than duck dried direct on receipt.

The relative amounts of moisture lost by 32-ounce belting duck in storage and in the cell drier as well as the total amount of moisture thus expelled from the duck before frictioning, are recorded in Table II. The data in columns A, B, and C are shown on the chart where the respective curves are similarly marked for identification.

TABLE II
MOISTURE LOSS OF 32-OUNCE BELTING DUCK

Days in Storage	Loss in Storage Per Cent A	Loss in Cell Drier Per Cent B	Total Loss Per Cent C
Cell dried without storage	...	4.77	4.77
20	1.20	3.85	5.05
43	1.33	4.10	5.43
109	2.33	3.40	5.73
133	2.94	3.14	6.08



Horizontal Duck Tester

Friction Coating

The friction calender consists of three horizontal rolls of the same diameter and length supported in heavy housings. The top and the bottom rolls are run at the same speed, which is two-thirds that of the middle roll. The differential in motion between the top, the middle, and the bottom rolls plasticates the rubber and forces it into the interstices of the fabric as it passes through the calender between the middle and the bottom rolls. The operation of frictioning fabric is pictured showing application of rubber on the first side. Coating the opposite side is effected by a second passage through the calender.

Approximately two-thirds of the total volume of rubber on the finished coated fabric is deposited on the first passage of the fabric through the calender, and the remainder on the second passage. The maximum speed is 40 yards per minute, but this cannot be maintained for long periods because the temperature increase may cause scorching of the rubber compound. For an average friction compound containing a not too active accelerator combination the top roll of the calender may be maintained at about 220° F., the middle one at 180° F., and the bottom one at 200 to 220° F.

Additional plies of rubber, known as skims, may be calendered onto the fabric after the frictioning process. In some belts all plies are skimmed; while in others only certain ones are skimmed. Belts may be classified as (1) non-skimmed, (2) all plies skimmed, and (3) designated plies skimmed. Properly compounded skims of suitable thickness, and correctly placed, add to the service life of a transmission belt by providing an extra amount of rubber to resist the flexing action which the belt must withstand.

The two principal varieties of rubber transmission belting are friction surface and rubber covered. The friction surface type, largely used in industry, has no distinct rubber cover other than that given to the fabric by the frictioning process. The rubber covered type has an additional thickness of rubber on the surface and is used for service in the presence of severe acid fumes, etc., and for exposure to the elements. The service life of rubber belting is materially dependent upon the quality and the correct quantity of rubber compounds used to unite its fabric plies. This is generally true of all goods constructed of plies of fabric bonded with rubber compounds.

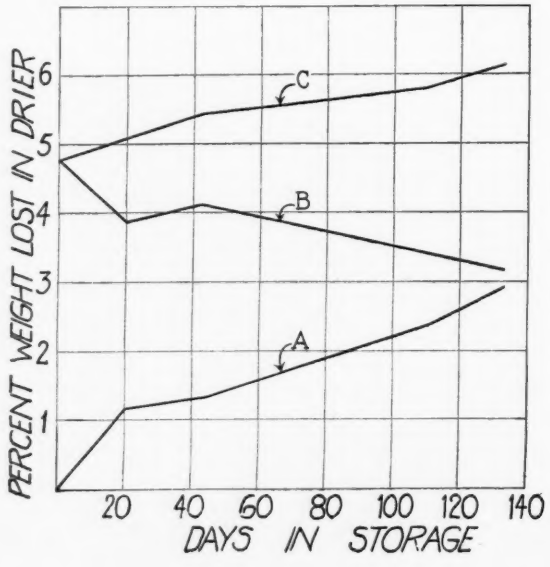


Chart of Weight Lost by Drying

Outline of Test Methods

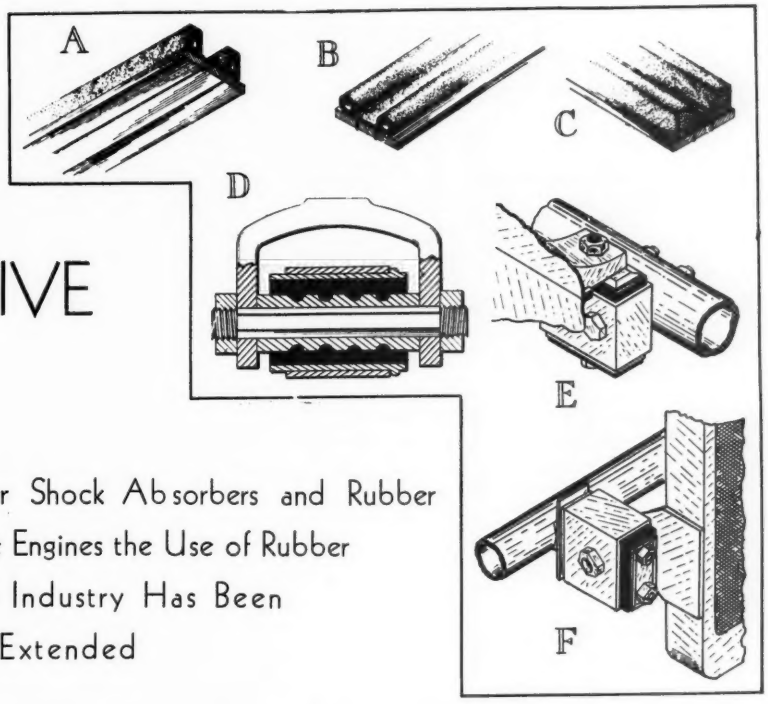
All grades of rubber belting whether of regular or special construction are made after specifications prescribing material quality of fabric and rubber, details of construction, curing, and test. The outcome of such specification is standardization of goods for better service, the success or failure of which is revealed by performance in service. To secure maximum efficiency of the product, requires close control of materials as they are processed, combined, and cured. This work constitutes the routine of the control laboratory and involves study of quality and construction of component materials, their fabricated combination, and physical testing. In the matter of testing rubber belting specified methods are available approved by trade and technical organizations.[5]

Belting quality tests will next be discussed.

[5] The Rubber Manufacturers Association; American Society for Testing Materials, 1930, Committee D-11 on Rubber Products; Bureau of Standards Circular No. 38; American Railway Association.

(*To be continued*)

WHAT'S NEW IN AUTOMOTIVE RUBBER



Since the Introduction of Rubber Shock Absorbers and Rubber Mountings for Automobile Engines the Use of Rubber in the Automotive Industry Has Been Greatly Extended

SHOCK absorbers and silencing devices of rubber for body and chassis are chief among these devices, aside from the tires and tubes. The more recently patented applications of rubber in automotive construction include channel strip material, rubber bumper housings, cushion joints for automobile springs, and rubber in aircraft mountings.

Channel Strips

One of the chief objects in the invention of channel strip rubber, besides providing for economy of manufacture of the material, is to produce highly resilient and deformable cushion strips adapted snugly to embrace the glass and prevent rattling. In this invention[1] the strip pictured in the group illustration, while resiliently engaging the glass, will yet remain in an extended condition without anchoring of its ends, nor will it buckle under the frictional force of the glass.

The channel is prepared in three forms: *A* in which the cushioning pieces are tubular of rectangular section; in *B* they are tubular of circular section; while in *C* they are of sponge rubber and rectangular.

In all these forms the channel members are felt covered, and the fabric is sewed to a base member of stiff, fibrous composition such as rubber impregnated fiber, rag stock, or fiber board.

Cushioned Spring Joint

The object of forming a cushion joint made of rubber is to unite the ends of the frame that support the chassis of an automobile to the spring ends. It is claimed[2] that by employing such a cushion joint no lubricant is necessary to prevent squeaking; also the possibility of breaking the spring because of lack of lubrication is eliminated. Such a joint always insures easy riding quality of the automobile.

In the group illustration *D* represents a central vertical section of the joint shown, assembled to the shackle of an automobile. The rubber part of the joint has the form of a bushing and is shaded black in the picture. It is compressed about a six-sided and grooved tube and is itself compressed within a cylindrical metallic cylinder whereby it can be assembled in a cartridge-like manner to the end of the leaf spring. Connection of the encased rubber cushion is made to the spring shackle by a hexagonal bolt passing through the tube of the assembly.

Rubber in Airplane Construction

The protection of the radiator, tanks, and other parts and accessories of airplanes from disturbance and damage by engine vibration is sought by the use of rubber cushioned mountings for engine and radiator[3].

In the illustration *E* shows the method of connecting the base of an airplane engine to the frame construction of the plane by bolting it to an intermediate rubber cushion compressed within a metallic encasement.

Similarly in *F* is shown the cushioned connection of radiator to the frame. In both *E* and *F* the projecting ends of the rubber cushion are indicated in heavy black shading.

[1]U. S. Patent No. 1,771,502, July 29, 1930.
[2]U. S. Patent No. 1,772,730, Aug. 19, 1930.
[3]U. S. Patent No. 1,773,481, Aug. 19, 1930.

Industry and Trade

Business activity during the first half of September showed little change from conditions which prevailed during August. The long-awaited upturn in building activity, the recovery in automobile production, the strengthening of industrial demand for coal, and a vigorous upswing of steel production, have all failed to materialize.

The automobile industry saw a dip in output during August from the level of July. Passenger cars and trucks produced, estimated at 240,100, were 12 per cent below July's, and approximately half of the output in August, 1929. Manufacturers are continuing the policy of keeping production in line with retail demand.

Consumption of crude rubber by manufacturers in the United States during August is estimated at 30,575 long tons by the Rubber Manufacturers Association, an increase of 4.6 per cent over July consumption but 20 per cent under consumption in August, 1929. Imports of crude rubber in August totaled 34,558 tons, slightly more than in July, with total stocks on hand at the end of the month roughly 6,000 tons greater. *National Industrial Conference Board.*

Rubber Footwear Trade Shifts[1]

While American, Canadian, and British Exports Still Lead, Some Small Countries Are Gaining Fast

THE United States continues by a good margin to be the largest exporter of rubber footwear, according to Department of Commerce reports. In 1929 it shipped abroad 13,004,861 pairs as compared with 9,642,097 in 1928, a 36 per cent gain. Increases were noted in all classes—rubber boots by 18 per cent, shoes by 33 per cent, and canvas rubber-soled shoes by 41 per cent. While the United Kingdom remained the best market, Germany was responsible for most of the increase in exports.

Canada followed the United States with 11,609,834 pairs in 1929, compared with 9,442,541 in 1928. It led all countries in 1929 in supplying canvas rubber-soled footwear, shipping 9,289,896 pairs, an increase of 26 per cent over 1928. Argentina was its best customer, taking 3,041,887 pairs. Its chief markets were Great Britain and its dominions.

Japan furnished the surprise for 1929 with an export of 6,954,288 pairs, compared with 2,679,180 in 1928. This country has now become a strong competitor of the three heretofore leading export countries. It is sending great quantities of low-priced rubber shoes to Far East markets. Export figures for 1930 are indicating that it may even outstrip the United States. For January, February, March, and April, Japan exported 4,437,000 pairs, whereas the United States shipped but 2,752,000.

A year ago the combined shipments of the United States, Canada, and the United Kingdom comprised about 65 per cent of the total volume of international trade. It is doubted if they are now up to 50 per cent. British producers are in fourth place, showing exports of 4,125,432 pairs in 1929, contrasted with 3,251,556 in 1928. Of the total pairs in 1929, rubber boots accounted for 202,740, and canvas rubber-soled shoes, overshoes, and rubbers for 3,922,692 pairs. South Africa took 565,608 pairs in the latter class, and the Irish Free State 450,948. Denmark took 62,064 pairs of rubber boots.

Although British Malaya suffered from the burning of its principal footwear factory and thus gave the Japanese a chance to make large sales there last year, it exported 2,223,400 pairs in 1929, compared with 2,443,956 in 1928. It is likely to be a negligible factor in the 1930 trade.

Fifth in the list, France exported 2,746,300 kilos of rubber footwear in 1929, although it shipped 3,502,600 kilos in 1928. It lost ground in such markets as the United Kingdom, Czechoslovakia, Austria, and the Netherlands, but gained in Syria, Belgium, Germany, and Egypt.

Poland loomed up in 1929 with exports of 1,171,600 kilos, compared with 11,200 in 1928. Latvia reports 1,121,000 in 1929, compared with 1,417,500 kilos in 1928. Sweden shows 1,042,260 for 1929, contrasted with 984,821 for 1928.

Germany reports 362,300 kilos for 1929, compared with 268,600 for 1928, but this does not include canvas rubber-soled shoes. Exports exceeded imports by 91,900 kilos. Great Britain was the principal market, taking 123,400 kilos. Then followed Denmark, Italy, and Brazil. Germany has been speeding up production, and its foreign trade for the first four months of 1930 nearly equaled its exports for the whole of 1929.

Norway's 1929 exports were 257,282; in 1928, 170,712 kilos. Czechoslovakia in 1929 shipped 175,000, and in 1928, 48,000 kilos. Belgium in 1929 showed 172,900 kilos exported, dropping from 255,500 in 1928. Italy rose from 37,007 in 1928 to 82,425 in 1929. The Netherlands dropped from 132,405 in 1928 to 45,022 in 1929. While figures are not available, Austria's footwear trade with neighboring states is estimated at over $1,000,000 a year.

[1] From *Commerce Reports*, July 21, 1930.

Rubber Seed Cake as a Feedstuff[1]

Felix T. Pope
Foodstuffs Division, Department of Commerce

ALTHOUGH experiments have been conducted for several years in the use of rubber seed for crushing, the seed was not used in this country commercially until 1929, when owing to the world shortage of flaxseed occasioned by the extremely short crops in Argentina and the United States for that year, and the resulting high prices, the Hevea rubber nut or seed was one of the substitute seeds to be brought into some prominence.

The rubber nut of commerce is the seed of the cultivated rubber tree grown on plantations throughout the Netherland East Indies and British Malaya. Production is estimated at about 500,000 tons annually, of which some 300,000 tons are produced in British Malaya. Sumatra and Java together produce approximately 175,000 tons and the rest is produced in other islands of the Netherland East Indies.

The trade estimates that 1930 imports will amount to about 3,500 tons, which is expected to be increased to at least 10,000 tons in 1931.

Rubber seed when crushed produces about 44 per cent of oil, 50 per cent cake or meal, and there is approximately 6 per cent shrinkage. The oil is said to be used as an edible oil, and in making soap, linoleum, and paint, and has practically the same analysis as soybean oil.

The Virginia Polytechnic Institute, in conjunction with the Virginia Agricultural Experiment Station, has recently issued a bulletin on Feeding Hevea Rubber Seed Meal for Milk Production. This bulletin states that Hevea rubber seed meal is a new high protein cattle feeding concentrate in the United States, having a pleasant odor something like coconut meal. They give the following analysis of recent samples of the meal:

	Per Cent
Moisture	5.0- 6.0
Oil	4.4- 6.0
Protein	30.0-33.8
Carbohydrates	40.0-44.0
Crude fiber	7.2-12.0
Ash	5.6- 6.0

Certain experiments were carried on to determine milk production with dairy cows.

Two groups of cows were used with two cows in each group. The basic ration for each cow was 20 pounds of corn silage and 8 pounds of alfalfa hay daily. Group 1 received 5 pounds of Hevea rubber seed meal and group 2 received 5 pounds of linseed meal daily in addition to the basic ration.

When fed Hevea rubber seed meal, the milk production for both groups totaled 1,937.9 pounds, as against 1,779.4 pounds when fed linseed meal; while butterfat production for both groups amounted to 73.1 pounds, in contrast to 71.4 pounds.

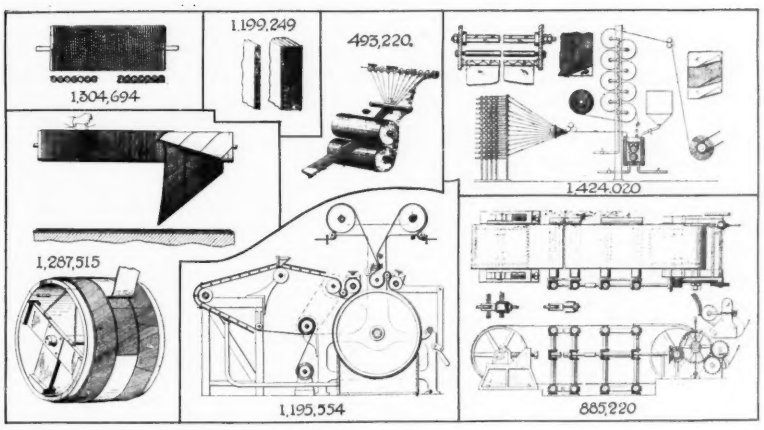
Experiments were also made in feeding to sheep with satisfactory results.

It appears that the production of rubber seed will shortly begin to offer some competition to linseed, soybean, and other oilseeds, as the value of the oil, cake, and meal begin to be recognized generally.

[1] From *Commerce Reports*, September 8, 1930.

Manufacture of Weftless Cord Fabric

JOSEPH ROSSMAN, PH.D.



WEFTLESS cord fabric consists of parallel cords held out of contact with each other by rubber. Practically all pneumatic tires are at present made from weftless fabric because it is the most efficient material known. At first tires were built from square woven fabric coated with rubber and vulcanized to produce a homogeneous structure. Many rubber products were also made by placing a sheet of woven fabric upon a sheet of rubber or between two sheets of rubber or upon both sides of the sheet of rubber and vulcanizing together. Where a material made up of interwoven threads is subjected to continuous flexing, as in a tire, a covering for hose, belting, etc., it is found that contact of the threads causes friction which results in the destruction of the fabric. For this reason weftless cord fabric is widely used because it contains no threads which cross each other in frictional engagement.

The Palmer Process

THE basic U. S. Patent No. 493,220, shown in the group illustration, for making weftless cord fabric, was granted March 7, 1893, to John Palmer. To produce the fabric an ordinary rubber calender is employed; the linen threads, being delivered from spools, are fed between the rolls in parallel lines and embedded in the rubber sheet. The threads may be fed to the reverse side of the sheet, either by passing it through the calender again or by feeding the threads on both sides of the sheet during its forward movement.

Another sheet similarly produced may be laid at a right angle or another angle upon the sheet first produced, the threads being separated by a layer of rubber. The vulcanized product will be incapable of stretching longitudinally of either set of threads if the threads are non-stretching, or if they are extensible, the stretch of the fabric will be limited to the extensibility of the fibers. The fabric may be stretched to the limits permitted by the elasticity of the rubber transversely of the threads, or where two sets are arranged at an angle to each other, in a direction intermediate of the longitudinal and transverse direction of either, with the advantage that the fabric will return to its former condition after stretching. To prevent stretching in any direction the number of layers may be increased, each being applied at an angle to all the others. Thus a fabric may be obtained incapable of stretching longitudinally but stretchable in all other directions, or incapable of stretching in any direction.

The Use of a Single Cord

THE Palmer method has the great advantage of being a continuous process and therefore the most economical. However, weftless cord fabric can be made by other methods. According to U. S. Patent No. 662,963 the process consists in laying a single thread in equal lengths from right to left and vice versa alternately, the thread being bent or doubled each time before returning to form a looped edge, causing the series of parallel threads to run in an oblique direction, and laying another similarly produced fabric thereon so that its series of parallel threads are disposed at an angle to the other series. This gives a two-ply fabric, each ply comprising a series of parallel threads and approximately non-extensible, formed out of a single length of thread which runs alternately from one side to the other and from opposite edges of the fabric, where it is looped before returning in the opposite direction, thus forming a looped selvaged edge to the fabric.

The two plies of fabric when placed together have their series of parallel threads presented obliquely or at an angle the one to the other, and the two plies are united by means of rubber solution, with which the adjacent faces of one or each of the two plies is coated, or a thin sheet or film of rubber may be interposed between the two plies of fabric, and after pressure has been applied to embed the threads the whole is vulcanized.

Winding on a Drum

ANOTHER U. S. Patent No. 1,217,879 winds the thread on a rotating drum to form a single layer with the turns in close contact. The thread is guided into place on the cylinder by hand; mechanical spooling might be used. When a single layer of thread is wound on the cylinder, a rubber adhesive is thinly coated over the layer to hold the threads together. The thread coating is then cut into bands, the lines of the cuts taking a spiral direction on the drum. These cuts can be made at any angle depending upon the direction which the threads are to occupy in the resultant bands of fabric. The drum may be made of any length, so that there is no practical limit to the length of the bands which can be produced. After the cuts are made the bands are taken off and employed in fabricating tires.

The practice has been in following the process just outlined to mount a single drum between the spindles of a lathe equipped with a screw feed, and after winding a drum full of cord, either to slit the cord-cylinder and strip off the band while the drum remains in the lathe, or to take out the drum, remove it to a rack where the slitting and stripping are performed, and replace it with a fresh drum. In either case the winding operation is interrupted for a considerable period, and the capacity of the apparatus is correspondingly reduced.

Dipping the Cords in Rubber Solution

WEFTLESS fabric can be made by passing the cords through a rubber solution instead of using the calender. U. S. Patent No. 1,420,271 consists in drawing a plurality of cords in sheet formation through rubber cement, then alining the cords in slightly spaced relation but sufficiently close so that the cement will form a web, then removing any surplus adhesive from the sheet, then drying the sheet and at the proper point in this operation, crowding the threads together but maintaining a thickness of adhesive between them. This method also contemplates having the cords stretched under tension during the several steps mentioned.

The Use of Rubber Latex

RUBBER latex used in the Hopkinson, U. S. Patent No. 1,424,020 for making weftless cord fabric, is shown in the group illustration. A series of cords is led from spools through creel-eyes, an expansion comb, and over an idler above a latex tank through which the cords arranged in parallel relationship and touching each other are passed. The latex is treated with ammonia for preservation and is of an undiluted consistency say, 25 to 40 per cent of rubber. The cords then pass through squeeze-rolls and are compressed to expel entrapped air and the latex allowed to penetrate into the fiber. The latex treated cords pass out of the tank through an ex-

pansion comb which insures that the relationship which the cord had upon entering the tank is maintained. Passing on to an idler roller the cords then proceed through blades which scrape off any excess of latex.

The cords passing from the blades are met by a liner-cloth of fine sheeting which passes between the cords and the surface of the first dry-can of the series. The liner serves as a carrier for the cords and passes with the cords lying thereon throughout the series of dry-cans. During this passage the latex is coagulated and dried. One passage of cords through latex at ordinary temperatures causes an absorption of 20 to 25 per cent of dry rubber based on the cord weight. Cords similarly immersed in the rubber cement adapted for coating cord-fabric results in the absorption of approximately 8 per cent of dry rubber based on the weight of the cords from such cement. A second passage through latex of cords which have absorbed 20 to 25 per cent of rubber from latex causes a total absorption of approximately 30 per cent of dry rubber based on the weight of the cords taken.

The increased absorption of rubber from latex when compared with cement is perhaps due to the difference in the character of the solid constituents of latex and the rubber of the cement, but the absorption is aided also by the fact that the solid particles of the latex are generally smaller than those of the rubber cement, and their penetration is therefore better.

Many U. S. patents have been granted for inventions relating to the manufacture of weftless cord fabric. The machines have been so perfected that nearly all waste is eliminated. Cord fabric can be made continuously in long lengths without any flaws. The following abstracts give a survey of the U. S. patents relating to the processes and machines for making weftless cord fabric as well as the fabric itself.

Abstracts of Patents

1. Palmer, 493,220. Mar. 4, 1893. A fabric composed of parallel cords held together by rubber. (See group illustration.)

2. Preston and Kendrick, 662,963. Dec. 4, 1900. A fabric consisting of two series of parallel inextensible threads, one series being at an angle with the other, each series being formed out of a single thread which runs alternately from one side to the other and from opposite edges of the fabric where it doubled before returning in the opposite direction, thereby forming a looped selvaged edge to the fabric.

3. Gray and Sloper, 799,374. Sept. 12, 1905. Pressure is applied to a plurality of unvulcanized rubbered cords to flatten and give them an elongated cross section, bringing the cords together with their wider faces in contact to form a flat band, subjecting the band to pressure to unite the cords, and separately applying pressure to part of the fabric to increase its area.

4. Bayne and Subers, 885,219. Apr. 21, 1908. A fabric made of a layer of parallel threads, and a superimposed layer of parallel transversely arranged threads, the threads of each layer being composed of united fibrous strands, each strand having a coating of elastic non-fibrous material before uniting the strands together and each thread having compressed thereon a cylindrical coating of elastic non-fibrous material, the adhesive coatings joining the strands together at the time the fabric is made, and of sufficient thickness to maintain them out of contact with each other.

5. Bayne and Subers, 885,220. Apr. 21, 1908. This comprises an endless band of polished metal upon which the thread is applied, and a spring pressed director wheel adapted to come into contact with all parts of the table in such a manner as to apply the coated thread directly thereto with pressure. (See group illustration.)

6. Bayne and Subers, 894,172. July 21, 1908. A thread comprising fibrous strands grouped together, the strands being saturated and coated with a non-fibrous flexible material and the completed thread also coated with a non-fibrous and flexible material, the coatings upon the strands and threads being adhesive and vulcanizable.

7. Bayne and Subers, 940,779. Nov. 23, 1909. The individual strands previously coated are wound or twisted upon a coated central fine steel wire specially prepared to resist any chemical action of the coating, and the completed cord is subsequently coated with a distinct envelope of the same material with which the strands are coated.

8. Raymond, 1,123,375. Jan. 5, 1915. A tire fabric composed of a series of cords, each having a rubber core with a series of threads wound spirally about the core; a layer of rubber placed upon one side of the cords; and a layer of rubber and canvas secured upon the other side of the cords.

9. Lister, 1,147,253. July 20, 1915. A tire forming strip composed of a plurality of closely adhering layers which have a tendency to conform to the shape of the tire core.

10. Raymond, 1,171,247. Feb. 8, 1916. A cord having a rubber core surrounded by a plurality of threads treated with rubber cement, the threads being wound spirally around the core in the same direction.

11. Price, 1,193,715. Aug. 8, 1916. A fabric for tires embodying a plurality of independent adjacent and non-intersecting threads extending lengthwise about a tire or other annular body, transversely thereof, and converging toward their opposite ends, whereby when applied to a tire or other annular body, each will extend in the plane of a radius of the tire or other annular body.

12. Ives, 1,194,388. Aug. 15, 1916. A cord tube formed of a continuous cord coated with a sticky rubber compound, which comprises an inner layer of transversely extended cords and a superimposed outer layer of cords which extend from the tread line divergingly around to or near to a parallel line 180 degrees removed from the tread line.

13. Ives, 1,194,389. Aug. 15, 1916. A two-ply tire fabric strip composed of two layers of contacting rubber coated cords of which the cords in the lower layer extend at substantially right angles to the edges of the strip, and the cords of the overlying layer extend divergingly from the center line of the strip toward opposite edges thereof and at similar angles to them.

14. Bourdin, 1,195,554. Aug. 22, 1916. The method consists in using two parallel warps of threads of indefinite length each warp having the width which the finished fabric is to have, but each having a number of threads of the finished fabric; the threads of each of the warps are intercalated in threads of the other and they are finally stuck to one another. (See group illustration.)

15. Dew, 1,199,249. Sept. 26, 1916. A fabric composed of a sheet of unspun fibers approximately one fiber thick, impregnated and incorporated with a liquid adhesive so that the fibers are entirely surrounded by the adhesive. (See group illustration.)

16. Pyle, 1,217,879. Feb. 27, 1917. Tire fabric is made by winding the cord upon the rotating drum with the successive turns in close proximity and parallel to each other, fixing the relative positions of the successive turns and cutting through the winding on a line running spirally along the drum to form bands in which the threads of the winding lie at the desired angle.

17. Dew, 1,236,685. Aug. 14, 1917. A number of sheets of unspun fibers are approximately formed one fiber thick with the fibers laid lengthwise and parallel, having their ends overlapping in the direction of their length, impregnating the sheets with rubber, superimposing a plurality of the sheets one upon another, and vulcanizing.

18. Price, 1,287,095. Dec. 10, 1918. A plurality of elements such as threads or cords are arranged substantially parallel with intervening spaces, coating them with rubber whereby the spaces are filled with the rubber, partially curing the cords, twisting them to produce a larger cord.

19. Tew, 1,287,515. Dec. 10, 1918. A cylinder of rubberized cord is wound upon a drum having a helical knife-guiding groove and a parallel molding groove, molding a ridge on the inner surface of the cord cylinder by means of the molding groove, slitting the cord cylinder along the knife groove to form a cord strip, peeling it from the drum, butting the ends of the strip to form an annular band of cords with the ridged face outermost, and overlaying the annular band with a rubber strip having one edge adjacent to the ridge. (See group illustration.)

20. Marquette, 1,304,694. May 27, 1919. The process consists in making use of a drum carrying a layer of tacky covering material thereon, winding a first strand spirally about the drum and upon the layer with turns of the strand spaced from the other to admit another strand, together with weft material between, wrapping a sheet of tacky flexible weft material about the drum to enwrap the turns of strand, winding a second strand spirally about the drum and upon the sheet, with its turns located to lie at the spaces between the turns of the first-named strand, while applying tension to the second strand sufficient to force the turns of such strand, and the sheet, down between the turns of the first strand, and then removing the fabric together with the layer from the drum. (See group illustration.)

(To be continued)

The German Rubber Association

The Fourth General Meeting of the Deutsche Kautschuk Gesellschaft (German Rubber Society) Was Held at Frankfurt a. Main during June 15-16. In View of the Importance of the Papers Read at This Meeting, Abstracts of Sufficient Length to Give the Reader a Clear Idea of the Contents Will Be Published in These Columns. The First of the Series Appeared in Our September Number, and the Second Installment Follows.

MINERAL Black as Reenforcing Ingredient in Rubber. By Ph. Schidrowitz, London. The blacks most in use today as reenforcing pigments are gas black, lamp black, and to a lesser extent, "soft" coals which are obtained by the cracking process or similar method. As yet, the mineral blacks, which in general are obtained from carbonaceous laminar, or slab shale, have not been considered for this purpose.

The occurrence of some varieties of these mineral blacks in a mine in Devonshire has been established, and they were found to contain about two parts of mineral substances (chiefly argillaceous and silicious earths) and one part of extremely finely divided anthracite coal. A method was worked out to refine this black to obtain a higher coal (carbon) content, and an installation was set up to carry out this process on a large scale. The refined black contains about two-thirds carbon and one-third mineral substances; while the pigment was found to possess considerable reenforcing effect.

It was proved that for a number of purposes this product shows the same or better properties as good lamp blacks, and that its reenforcing property is about 40 per cent of that of high grade blacks. A number of experiments were carried out both with standard mixes and also with a number of technical mixes, the results of which are reported.

The Tendency of Rubber Research in America. By Arnold H. Smith, Akron, O. We must differentiate between chemical or physico-theoretical research problems of the rubber industry and research work directly connected with problems of manufacture (factory problems). It, therefore, seems to be a particularly welcome fact that the Deutsche Kautschuk Gesellshaft, in contrast to the American Association, is also organized as a forum for engineers, because the future development of the rubber industry more than ever before demands intensive cooperation of the chemist and the engineer. This statement is borne out by the fact that the present technical development, for instance, strives toward a continual raising of the productive capacity of the equipment, which at times can only be made possible by suitably changing the properties of a compound, if the risk of obtaining faulty results in the end is not to be run.

The present tendencies in the working out of special accelerators in which the period of activation can be determined, the application of ingredients which delay the brittleness induced by sunlight, and ingredients to increase the elasticity are discussed. The improvements attained of late in gas black and zinc oxide are mentioned. The most recent problems pertaining to machinery technology are discussed as well as the importance of producing a first-class reclaim from the high-grade vulcanizates of the tire industry. Finally, the question concerning the suitability of tire profiles receives due mention.

On the Technical Application of Emulsions with Special Reference to Rubber Technology. By E. Da Fano, Milan. As a result of the direct manufacture of latex, the rubber chemist found himself forced to study the aqueous dispersions, especially the emulsions, a hitherto unfamiliar field. In this connection he could observe that the emulsions had long since found an important place in other branches of industry. That is, he found a field that had already been exploited and that only had to be adapted to his special case.

Following this introduction, the theory of special emulsions is developed along broad lines, particularly regarding conditions of stabilization and the action of emulgents. In addition, the reasons why the emulsions in application have great advantages over other dispersion systems, are given. Finally the possibilities for the technological application of emulsions are briefly treated, in which connection the uses of emulsions in rubber technology are specially emphasized.

Experiments in the Elongation of Vulcanized Rubber at High Speed. By A. van Rossem and H. J. Beverdam, Delft. The apparatus usually employed for elongation tests of rubber has only a low rate of speed. For example, the maximum speed of the Schopper dynamometer at Delft is only 120 cm. per minute. On the other hand experience shows that slightly overcured rubber, which gives high even optimum tensile strength values on the Schopper dynamometer, is brittle when rapidly stretched by hand and breaks at much less elongation. Unfortunately the authors had no apparatus with which the elongation curve at high speed could be registered and from which the tensile strength and elongation at rupture could be read.

A Charpuy pendulum hammer apparatus was used. The testing rings were attached to the hammer by two buttons and stretched at great speed to the breaking point. From the reading the energy at rupture could be calculated. Elongation tests were also carried out with similar rings on the Schopper dynamometer and the energy values at rupture determined from the curves registered.

Various mixes, vulcanized for increasingly long periods, were tested in this way. Thus, a compound of 100 parts of rubber, 5 parts sulphur, 1 part DPG, and 5 parts zinc oxide, was vulcanized for increasing lengths of time, the vulcanized sheets tested according to both methods, and the energy at rupture calculated in both instances. The following differences were shown:

1. The optimum energy at rupture, in relation to time, is much more distinct in the case of the pendulum hammer apparatus elongation test than in that of the Schopper test.

2. The optimum in the pendulum hammer test was found at a shorter period of vulcanization.

The same phenomenon was found for all mixes in which overvulcanization is possible.

In mixes with very little sulphur, e.g., 100 parts rubber, 3 parts sulphur, 1 part DPG, and 8 parts zinc oxide, a much less distinct optimum was found in connection with a shorter period of vulcanization.

The effect of various fillers was investigated. Assuredly the value of the optimum naturally depends on this, but the distinctness of the optimum and the position of the time axis were independent of the addition of the fillers examined.

Accelerated duration tests were carried out, according to the Geer-Evans method in an air chamber at 70° C. From the tests carried out so far it was proved that in duration tests too, and up to the energy optimum, vulcanized rubber gives the best results when the pendulum hammer is used.

The following conclusions were drawn from the experiments quoted:

1. In the case of technical tests, elongation tests at high speed offer great advantages as compared with ordinary elongation tests.

2. The pendulum hammer test is very serviceable for a simple stretching test and for direct determination of the energy optimum at rupture.

3. The vulcanization time required for

attaining the optimum energy at rupture with the pendulum hammer apparatus has a technical value when contrasted with the vulcanization time for optimium tensile strength; that is, the durability of the rubber vulcanized in optimum time is also optimum.

4. For these tests the pendulum hammer apparatus still shows quite a fair number of imperfections. It would be exceedingly desirable for the technical testing of rubber if the firms concerned would construct an apparatus suitable for such tests.

Phenomena during the Stretching of Rubber. By H. Mark and E. Valko, Ludwigshafen a. Rhein. Whereas the X-ray investigations of metals and salt crystals have disclosed in a far-reaching manner the molecular processes at the basis of macroscopic deformations, the same method employed for rubber, yields but few important or basic points. In spite of many an external resemblance in the deformation phenomena in metals and rubber, essentially different molecular mechanisms must be assumed in both cases. The most important question is, to what extent do intermolecular or intra-molecular processes take place during elongation. Only quantitative investigations of one and the same material, extending to all quantitatively comprehensible phenomena, offer any prospects of success. Such investigations were undertaken by the authors. But first of all it was found necessary to complete the experimental data concerning the resistance in the domain of low temperatures.

In many grades of rubber a linear dependence of the resistance to rupture on the elongation was shown. At low temperatures the curves for the traction elongation tests clearly indicate the division into several sections, which at ordinary temperatures is indistinct. At —67 deg. C. an inconstant variation takes place in the behavior of crude rubber during traction. Above this temperature the rubber is perfectly extensible; under this temperature the maximum elongation is at most about 50 per cent. This critical temperature is determined by the varying dependence of the strength on temperature where the resistance to separation and deformation is concerned. The plastic and elastic behavior of rubber in the domain of low temperatures was closely studied.

On the Dispersion of Gas Black and the Physical Properties of Vulcanizates. By E. A. Grenquist, Chicopee Falls, Mass. A qualitative method was worked out to investigate the dispersion of gas black in tread compounds containing a large amount of gas black as filler. This method is based on the application of vertical illumination of new smooth, cut surfaces of vulcanized and unvulcanized compounds. The changes in the degree of dispersion which can be obtained by progressive milling, kneading, and by rolling and cutting the mixes on the rolls, are reflected in an improvement in the final tensile strength and resistance to abrasion, however, only so long as the plasticity of the unvulcanized compounds does not fall below a certain point.

(To be continued.)

Crude and Reclaimed Rubber Survey

First Six Months—1930[1]

CRUDE rubber consumption in the United States amounted to 216,000 long tons during the first six months of 1930, and consumption of reclaimed rubber amounted to 88,000 long tons in the same period. It appears, therefore, that the low market prices for crude rubber prevailing in the first half of the current year have reduced the ratio of reclaim to crude consumption from 45.5 per cent in 1929 to 40.7 per cent in 1930. Comparable statistics are as follows for recent years:

U. S. CRUDE AND RECLAIMED RUBBER CONSUMPTION

	Crude Long Tons	Reclaimed Long Tons	Ratio Reclaim to Crude Per Cent
1925	388,000	137,000	35.3
1926	366,000	164,500	45.0
1927	373,000	189,500	50.8
1928	437,000	223,000	51.0
1929	467,400	212,700	45.5
1930 (first six mos.)	216,000	88,000	40.7

The present survey was conducted in an attempt to establish as definitely as possible the percentages of completeness of existing trade statistics issued by The Rubber Manufacturers Association, Inc. In the following table a comparison has been made between the returns on the present survey and the R. M. A. statistics, with an indication as to the percentage of completeness. The Rubber Division returns were raised to an estimated 100 per cent only after a careful consideration of the few outstanding unanswered questionnaires and the probable manufacturing activities of these companies in the first six months of 1930.

Reclaimed rubber production in the United States during the first six months of 1930 is estimated at 91,526 long tons, the statistical procedure being as follows:

	Long Tons
Stocks, Dec. 31, 1929	27,000
Stocks, June 30, 1930	25,000
Stock change	—2,000
Consumption, 6 months	88,000
Stock change	—2,000
	86,000
U. S. exports, 6 months	5,526
Estimated U. S. production	91,526

The Rubber Manufacturers Association reports United States reclaimed rubber production during the first six months of 1930 as 85,693 long tons; therefore the Association's report is estimated as being 93.6 per cent complete.

From time to time the Rubber Division has issued statistics covering net imports of crude rubber and calculations of stocks of crude rubber on hand in the United States and afloat to the United States. These various statistics are as follows for the first six months of the current year:

1929	U. S. Net Imports Long Tons	U. S. Month-End Stocks Long Tons	Plantation Afloat for U. S. Month-End Long Tons
Dec.	.....	122,062	67,009
1930			
Jan.	44,911	130,302	65,483
Feb.	40,792	138,369	71,015
Mar.	42,216	144,671	68,351
Apr.	43,036	147,500	62,495
May	40,012	148,057	61,791
June	37,425	150,849	59,385
Total	248,392		

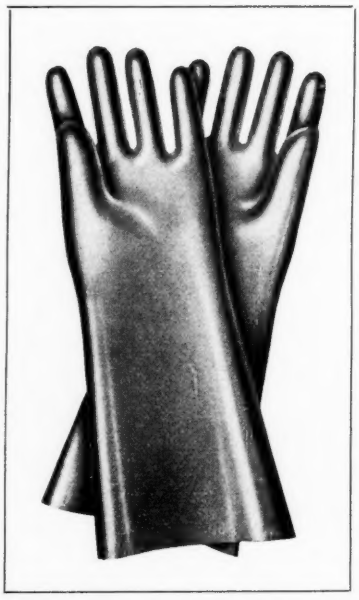
It will be noted that the calculated stock figure on June 30, 1930, of 150,849 tons is less by 4,151 tons than the figure of 155,000 tons indicated by this survey, this difference resulting from the use for the past six months of 90 per cent as the percentage of completeness of R. M. A. monthly consumption statistics.

[1]Special Circular No. 2,786, Rubber Division, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

SUMMARY OF U. S. CRUDE AND RECLAIMED RUBBER SURVEY—FIRST SIX MONTHS, 1930

	Survey Returns		R. M. A. Statistics	
	Reported Long Tons	Estimated 100% Long Tons	Reported Long Tons	Per Cent of Completeness
CRUDE RUBBER				
Consumption, 6 months	212,162	216,000	198,046	91.7
Stocks, June 30, 1930				
Manufacturers	93,234	95,000	86,443	91.0
Importers and dealers	59,014	60,000	52,226	87.0
Total stocks	152,248	155,000	138,669	89.5
RECLAIMED RUBBER				
Consumption, 6 months	86,890	88,000	70,461	80.1
Stocks, Dec. 31, 1929				
Reclaimers	11,401	13,000	8,360	64.3
Manufacturers	13,879	14,000	13,860	99.0
Total stocks	25,280	27,000	22,220	82.3
Stocks, June 30, 1930				
Reclaimers	10,494	12,000	*	*
Manufacturers	12,746	13,000	*	*
Total stocks	23,240	25,000	18,263	73.1

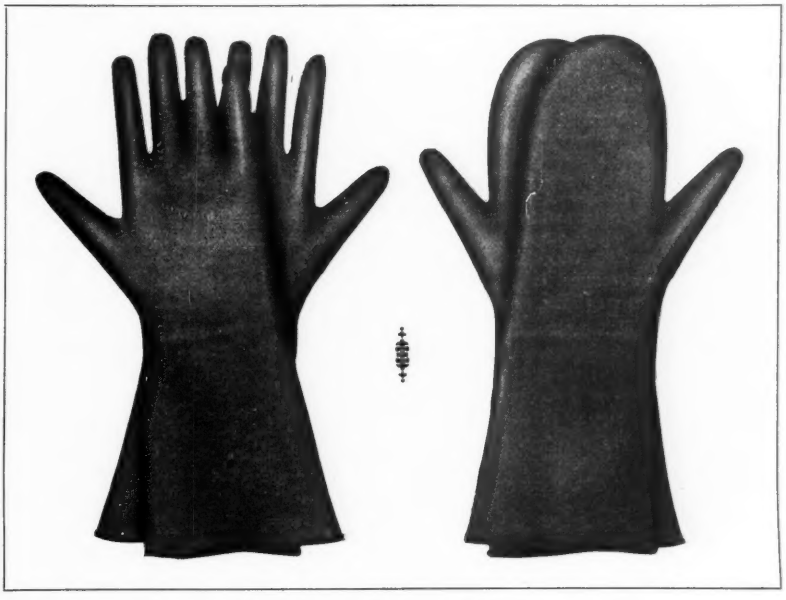
*Not reported separately in R. M. A. monthly returns. Reclaimed rubber stocks reported by R. M. A. on Dec. 31, 1929, are from quarterly returns.



Unlined Latex Gloves

Latex Gloves Popular

Hand Coverings Made from Original Fluid Said to Have Unique Qualities



Lined Latex Gloves and Mittens

HAVING demonstrated the exceptional value of inner tubes and some other articles made directly from latex, rubber manufacturers with special facilities for utilizing latex in this manner have been making from latex, gloves designed to serve all the purposes for which dipped gloves have so long been employed. Since the appearance of such products the demand has been steadily increasing, evidencing the fact that the gloves fill a long-felt want.

The new gloves are the result of rubber chemists employing principles hitherto never practically applied. In their making, the rubber particle is preserved in all its original strength and with all its unique qualities unharmed, it not having been subjected to even partial breakdown or other physical change such as ordinarily results from milling and calendering of rubber or its swelling in solvents. It is stated that rigorous tests show that latex gloves have superior aging, tearing, and wear-resistant qualities as compared with the ordinary type of dipped gloves; besides, the former have a higher degree of toughness, pliability, and resistance to water and various corrosive liquids. They are noticeably free, too, from the harshness often met with in hand coverings made of rubber deposited in the ordinary cement and evaporating process.

Comparisons of Strength

Resistance to deterioration is indicated by the fact that the material before aging shows a tensile strength of 4,090 pounds per square inch, which decreases to but 3,240 pounds after 96 hours in an oxygen bomb. Other gloves in the pure rubber class are said to show tensile before aging ranging from 1,410 to 3,210 pounds, and a drop to zero after being in the oxygen bomb in the case of some samples to 1,560 and 2,460 among better grades. For this reason and because of special care in manufacturing, such gloves are said easily to outwear ordinary dipped gloves and sometimes last even twice and three times as long.

Latex gloves are produced by repeatedly coating hand-shaped forms, uncovered or carrying net or twill for lining, with prepared latex, the latter being coagulated between dippings and the final product being thoroughly washed. The linings make the gloves not only easy to wear but save time in putting on and removal. Latex finger cots lack the usual roll at the bottom, rolling being regarded as unnecessary because of the inherent strength and tear-resistance of the material. Such cots are said to be less clumsy than the older type and do not impede blood circulation in fingers.

Uses and Sizes

Latex gloves made by the United States Rubber Co. are said to find considerable use in chemical operations, in electroplating including chromium, in fur, felt, tanning, textile finishing, and pickling plants, in sand blasting, and in handling mineral wool, lumber, metals, etc.

The longer or gauntlet unlined gloves are supplied in three weights, 15 and 19 inches, and sizes 9, 10, and 11. A household length, 11 inches, and unlined, comes in four weights, sizes 9, 10, and 11, with 7 and 8 if required. Lined gauntlet gloves come in three weights, 12 to 24 inches, and sizes 9, 10, and 11. Lined band wrist gloves and mittens are made in three weights, 12 inches; and lined gauntlet mittens in three weights, 15 and 18 inches. Cots range in sizes 000, 00, 0, 1, 2, 3, and 4.

Rubber Glass[1]

Safety glass made by sandwiching a layer of non-fracturable material between layers of glass is now being made by utilizing rubber as the non-fracturable component. For this purpose a calendered sheet of cured transparent rubber is interposed between two sheets of polished plate glass, and the three layers of material are united together by means of transparent uncured rubber cement. Application of the cement is made either to the rubber sheet or to the glass or to both rubber and glass. After the cement layers are fully dried by exposure in a room maintained at about 150° to 160° F., the glass and the rubber are sandwiched together in a press at the temperature named above. Two layers of transparent rubber are alternated with three of glass. In both constructions the rubber forms the internal non-shatterable safety feature. The rubber sheet is cut of smaller area than the glass sheets in order to leave a narrow margin for luting the edges of the rubber. It is thus protected from the atmosphere by caulking the edge spaces with pitch or similarly suitable weatherproofing material.

[1] U. S. Patent No. 1,748,079, Feb. 25, 1930.

Over the Top

With a Rubber Table or Counter Cover

WAR stories, plays, and talkies are all the rage now; so why not another? But this time the locale will not be behind American, English, or German lines; nor will our hero be a captain spurred on by drink, an aviator disappointed in love, or a private disillusioned from patriotism by the horror of war. Instead our chief character is a rubber table top, and the battlefield the furniture world.

Inferior materials and a lack of knowledge in production, installation, and marketing for a while threatened a decisive victory over the rubber table top. Indeed, it was revealed that such tactics delayed cessation of hostilities nearly two years.

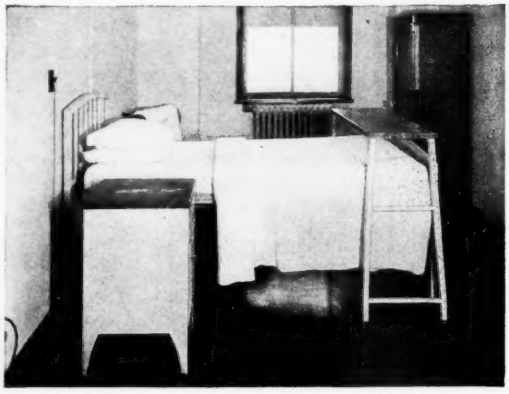
But fortunately these faults were overcome; the armistice dawned; the fight was won. In consequence the rubber table or counter top has annexed considerable popularity in the past year or two and now is in great demand by fixture houses, who report ever-increasing orders for this type of equipment.

Our hero has kindly allowed himself to be photographed[1]. We believe that a word picture too will help his cause. Two types of tops are available. The molded top, which comes in about ten standard sizes, can be fitted to any table of corresponding standard size simply by placing it over the top of the table as a cap. These molded tops, in which the edge is an integral part of the top as it is all made in an individual mold, are furnished in square, oblong, and round shapes in a striking array of colors, rivaling the rainbow division. This type top may be either cemented to the table or applied loosely as the weight of the top is sufficient to hold it firmly in place.

The other type, which is used by fixture manufacturers for counter, desk, and furniture tops, is sheet stock supplied in any special size up to 36 inches in width and 12 feet in length. Its thickness is $\frac{3}{16}$- or $\frac{1}{4}$-inch. This sheet likewise appears in various beautiful shades: the gray of the smoke, the red of the flame, the blue of the sky, the green of the grass, the brown of the earth, and even the black of night.

Where the table top is cut to size from a sheet of rubber, it is necessary to cement it to the under table, and in every case separate strips or edging should be cemented around the sides of the table or the counter. The most satisfactory procedure is to have the top slab extend $\frac{3}{16}$- or $\frac{1}{4}$-inch beyond the table so that the side edges can be cemented underneath the table top. Thus the seam will appear on the sides rather than the top surface. After the edgings or sides have been cemented, the sharp top corner usually is buffed off with fine sandpaper. The result is a neat and attractive installation having the appearance of heavy slab. For this material is offered in any number of desired color effects, and by treatment with several kinds of moldings and edges it is possible with marked success to simulate marble and different natural stone table tops, counter fronts, and partitions.

Although a victory was scored, our hero, like all conquerors, discovered enemies still rampant. Did you know that the sleeves on your clothes, by rubbing against the table or the counter top, leave scars on the rubber, which even time will not eradicate, damage that can but hasten the end of the covering? But our wise soldier, as protection against this onslaught, provides himself with a reenforced edge or elevated ridge around the edge. Sometimes even metal has been used to check these ravages of wear.



Rubber Table Tops on Duty at the Presbyterian Hospital, New York, N. Y.

Another arch enemy of the rubber counter or table top is grease. Again aid is summoned—orders to the chemical warfare service. The result? One manufacturer uses a special, secret process; a brush plate finish, which seals the voids and gives a smooth, polished surface. And our hero is saved!

Why rejoice at such glad tidings? Because the rubber table top is destined to rise to even higher ranks of importance in the furniture business. In the home, in restaurants or hotels, in shops or schools, most certainly in hospitals, the rubber table top is ever-ready to do his bit.

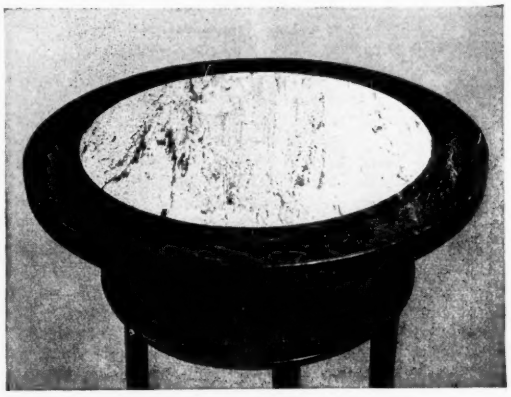
For example, in the sickroom the rubber table top is a veritable blessing. Sanitary, noiseless, impervious to liquids, especially spilled medicines, the rubber top does unfailing duty on the small table beside the bed as well as on the table stretched across the bed for the invalid too ill to sit up. The pretty colors, furthermore, have a cheering effect on the patient; this, any doctor will tell you, helps speed recovery.

Or in the home—Besides being utilized for tables

Rubber Counter Top Ready for Action in the Hotel New Yorker

[1]Illustrations through the courtesy of the United States Rubber Co., New York, N. Y.

where meals are served or upon which ornaments are placed for decorative purposes, another important field has opened to the rubber top. For about two years several furniture manufacturers have been



Special Rubber Table Top

making card tables with rubber tops. Most of these have been of the sheet stock type. By having dies shaped for hearts, spades, clubs, and diamonds, it is quite simple for the manufacturer to stamp out designs and insert the card symbols. One particularly attractive model boasted a green background, and in each corner was a card symbol, the diamond and the heart in red, the spade and the club in black. In the center of the table top appeared a checkerboard in regulation red and black squares. These inserts are not expensive as no waste occurs and the labor is almost negligible.

It is possible also to have seat covers made of the sheet stock type to match counter and table topping.

Rubber cove bases, too, on counter work have won recognition from fixture manufacturers. Many modern refrigerator show cases carry a cove base as standard equipment.

The stock for rubber tops should be odorless, of great density, and with a generous reserve of aging quality. It should be of non-blooming composition in order that no free sulphur may be on the surface to discolor silverware placed upon it. The hard rubber surface formerly ordered has surrendered to a more resilient surface because of the obviously better aging qualities of the latter.

Our hero, the rubber table top, has many advantages over his rivals: marble, glass, wood, or other composition table tops. The rubber one will not break and enjoys greater longevity than do the others. It is noiseless and resilient. The soft, elastic material of which it is composed cushions shocks and blows, helps create an atmosphere of restfulness and ease. Sanitary, the rubber top will not absorb moisture and is easily cleaned. Heat, fruit juices, and alcohol have no ill effects on the rubber. Burning matches and lighted cigarettes will not mar the rich surface textures, even in the most delicate hues. Properly vulcanized, the rubber in these tops will not tarnish silverware. The merits of this covering, however, are better demonstrated by its service in action more than by mere words.

To keep the table top in condition it always should be kept clean. Remove any foreign substances from the surface as soon as possible. Do not employ soap because the grease in it is deleterious. Instead enlist a mild detergent, free of grit, for the purpose, in water. Then use fresh water alone and next buff the surface dry with a soft cloth until the highly polished finish recaptures its original luster.

It is suggested that the manufacturer from whom this material is purchased be consulted in the installation of these tops as well as for other problems that may arise during their service.

In selecting rubber table tops the color scheme is of major importance. Advices read that monotones be chosen. Tans, browns, grays, blues, or greens are preferable. The mottled motif is most practical since it doesn't show the dirt so readily. When drafting colors, it is well to consider whether the table top is to be of the feature or of the background type. The former, as the name indicates, is to be the dominating note in the room with the rest of the furnishings subordinate to it. Brilliant, bizarre, a commander-in-chief of the entire army in formal full dress is no more resplendent. But such a vivid personality hardly seems in keeping with our modest hero. Rather, we think, he is of the background type. Soft, subdued, neutral in tonal effect, fitting harmoniously into whatever color creations the interior decorator may devise—like the efficient private, the rubber table or counter top is not conspicuous, does not command undue attention, performs his work silently and well, yet is the backbone, the very being of the organization.

Counter Topping Installed in the Savarin Restaurants

Molded Table Tops in Service in the Savarin Restaurant, New York Life Building

Bicycles Gain in Popularity

George W. Fuller, specialist for the Census of Manufacturers, Bureau of the Census, Washington, D. C., recently declared that the bicycle is increasing in public favor as a means of conveyance. During the revival of the popularity of the bicycle, however, the motorcycle has been experiencing a slump.

Preliminary census of manufactures figures show that there were 307,845 bicycles, valued at $6,183,773, marketed in 1929, an increase of 20.5 per cent in number and 6.6 per cent in value over 255,456, valued at $5,803,440, for 1927. Bicycle parts production also mounted, last year's output totaling $3,450,726, as against $2,206,051 in 1927, an increase of 56.4, which is further evidence that bicycles are being used to a greater extent.

Rubber Questionnaire

*First and †Second Quarters, 1930

Long Tons

	Inventory at End of Quarters		Production		Shipments		Consumption	
Reclaimed Rubber	1st Q	2nd Q	1st Q	2nd Q	1st Q	2nd Q	1st Q	2nd Q
Manufacturers who also reclaim	8,403	8,521	26,241	26,525	16,896	18,462	.....	.....
Reclaimers solely	7,633	7,747	16,196	18,744	9,263	8,229	20,820	21,866
Other manufacturers	3,483	3,658	.....	.....	.....	.....	18,478	17,602
Totals	19,519	19,926	42,437	45,269	26,159	26,691	39,298	39,468

Long Tons

	Inventory		Consumption		Due on Contract	
Scrap Rubber	1st Q	2nd Q	1st Q	2nd Q	1st Q	2nd Q
Reclaimers solely	31,193	32,864	20,280	24,108	7,482	6,475
Manufacturers who also reclaim	33,387	33,335	31,639	33,143	10,737	8,747
Other manufacturers	388	312	.....	.....	.....	.....
Totals	64,968	66,511	51,919	57,251	18,219	15,222

TONS OF RUBBER CONSUMED IN RUBBER PRODUCTS AND TOTAL SALES VALUE OF SHIPMENTS

	Crude Rubber Consumed Long Tons		Total Sales Value of Shipments of Manufactured Rubber Products	
Products	1st Q	2nd Q	1st Q	2nd Q
Tires and Tire Sundries:				
Automobile and motor truck pneumatic casings	61,642	70,430	$105,939,000	$121,882,000
Automobile and motor truck pneumatic tubes	12,384	13,887	15,619,000	17,215,000
Motorcycle tires (casings and tubes)	96	91	243,000	253,000
Bicycle tires (single tubes, casings, and tubes)	345	299	534,000	621,000
Airplane casings and tubes	15	19	83,000	130,000
Solid and cushion tires	1,577	1,089	2,374,000	2,683,000
All other solid tires	72	104	335,000	324,000
Tire sundries and repair materials	1,149	1,153	3,712,000	3,167,000
Totals	77,280	87,072	$128,839,000	$146,275,000
Products				
Other Rubber Products:				
Mechanical rubber goods	4,628	5,728	$24,149,000	$26,578,000
Boots and shoes	4,944	3,750	20,148,000	17,683,000
Insulated wire and insulating compounds	999	965	‡7,089,000	‡7,256,000
Druggists' sundries, medical and surgical rubber goods	318	423	1,626,000	1,827,000
Stationers' rubber goods	386	369	585,000	564,000
Bathing apparel	254	222	709,000	1,636,000
Rubber clothing	312	271	1,083,000	1,012,000
Automobile fabrics	231	293	2,230,000	2,179,000
Other rubberized fabrics	471	417	1,506,000	1,612,000
Hard rubber goods	279	302	‡1,257,000	‡1,220,000
Heels and soles	1,952	1,694	5,945,000	4,659,000
Rubber flooring	261	303	1,029,000	1,117,000
Sporting goods, toys, and novelties	511	620	1,793,000	3,307,000
Miscellaneous, not included in any of the above items	655	821	2,862,000	3,161,000
Totals	16,201	16,178	$72,011,000	$73,811,000
Grand totals—all products	93,481	103,250	$200,850,000	$220,086,000

INVENTORY OF RUBBER IN THE UNITED STATES AND AFLOAT

Long Tons

	Plantation		Para		All Others		Totals	
On Hand	1st Q	2nd Q	1st Q	2nd Q	1st Q	2nd Q	1st Q	2nd Q
Manufacturers	80,087	84,620	1,706	2,249	430	512	82,223	87,381
Importers and dealers	52,459	49,106	2,300	1,710	428	571	55,187	51,387
Totals on hand	132,546	133,726	4,006	3,959	858	1,083	137,410	138,768
Afloat								
Manufacturers	12,701	14,200	.....	.....	.....	.....	12,701	14,200
Importers and dealers	40,636	28,717	591	211	.....	75	41,227	29,003
Totals afloat	53,337	42,917	591	211	.....	75	53,928	43,203

*First Quarter—Number of rubber manufacturers that reported data was 157; crude rubber importers and dealers, 56; reclaimers (solely), 7; total daily average number of employes on basis of third week of January, 1930, was 151,113.

It is estimated that the reported grand total crude rubber consumption and the grand total sales value figures to be approximately 92 per cent; the grand total crude rubber inventory figures 95 per cent, and afloat figures 80 per cent; the reclaimed rubber production 91 per cent, reclaimed consumption 77 per cent, and reclaimed inventory 78 per cent of the total for the entire industry.

†Second Quarters—Number of rubber manufacturers that reported data was 171; crude rubber importers and dealers, 51; reclaimers (solely), 8; total daily average number of employes on basis of third week of April, 1930, was 144,553.

It is estimated that the reported grand total crude rubber consumption and the grand total sales value figures to be approximately 92 per cent; the grand total crude rubber inventory 90 per cent, and afloat figures 73 per cent; the reclaimed rubber production 96 per cent; reclaimed consumption 90 per cent; and reclaimed inventory 80 per cent of the total of the entire industry.

‡One company did not report its sales, but did report crude rubber consumption, stocks, etc.

Compiled from statistics supplied by the Rubber Manufacturers Association, Inc.

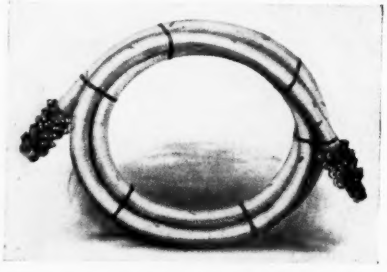
Tire Production Figures

Inventories of pneumatic casings on hand on July 31 were at the lowest levels since November 30, 1928, according to statistics issued by The Rubber Manufacturers Association, Inc. This organization reports 12,599,091 casings on hand on July 31, a decrease of 11 per cent under June 30 of this year and 21 per cent below July 31 a year ago. Shipments of pneumatic casings for July amounted to 5,810,448 and represent an increase of 2.9 per cent over June, although 26 per cent under July, 1929, and 26.4 per cent under July, 1928.

Production of pneumatic casings for July is placed at 4,257,409, a decrease of 22 per cent under June, 34 per cent under July a year ago, and 34.5 per cent below July, 1928. Production of pneumatic casings for the first seven months of 1930 exceeded shipments by less than one-half of one per cent as compared with a 6 per cent excess the same period a year ago and a 3 per cent excess in 1928. Shipments of pneumatic casings for the first seven months of 1930 were 24 per cent below the same period in 1929 and 16 per cent under 1928.

Semi-Metallic Rotary Hose

INCREASINGLY heavier equipment is being required in sinking oil wells to deeper levels than formerly. This has necessitated the development of rotary hose of extraordinary bursting strength. The illustration represents a new type of rotary hose that is protected from exterior wear and abuse by special, free flexing ball-joint steel armor. Its inner construction is built up with metallic members to prevent elongation. The tube is of highest grade rubber to resist effectively wear and abrasion from sand, slush, and mud. Each length of finished hose is coupled with the improved "Boss Tri-Duplex Coupling" and then tested to 4,000 pounds per square inch in the 2½-inch size, which is that most commonly used. Goodall Semi-Metallic Hose & Mfg. Co., 165-171 W. Columbia Ave., Philadelphia, Pa.



New Super Goodall Semi-Metallic Rotary Hose

A PRESS HELPER, WHILE PULLING MOLDS out of a press, had his left index finger caught between two molds. His finger was injured to the extent that it became necessary to amputate the finger at the first joint. This injury was charged with 150 days lost. *Rubber Section News*, National Safety Council.

Independent Dealer Can Endure

Trade Experts Believe That He Has More Than a Fighting Chance —Quality, Service, and Enterprise Win in Dealing with Newer Forms of Competition

IN A recent interview Vice President J. H. Michelin, of the Michelin Tire Co., stated that the reason why the New Jersey plant had been closed was that conditions in the tire business had made it impossible to continue with any chance of breaking even.

"Independent dealers," he said, "are dropping out fast; while the fight for volume in tire sales goes on between chain stores and gas stations on one side and factory controlled retailers on the other."

The closing of the Michelin works after twenty-three years of operation, during which time the management had earned an enviable reputation for upholding high standards in products and merchandising, is deeply regretted by the rubber trade. However, like many another worthy concern that found the odds growing against it, it concluded to quit with honor lest further continuance add to the hardship of those backing that pioneer among tire-making enterprises.

Must Independent Dealers Quit?

Difference of opinion as to the future of the retail dealer are as plentiful in the rubber trade as in any other line of business. While many, for instance, take the same view as Mr. Michelin as to the outlook for the independent dealer, the conviction is growing among many others well qualified to judge commercial trends that contrary to a widespread impression the independent has much more than a fighting chance for survival. While conceding that the newer forms of competition may not actually be the life of business, they insist that such forms are not necessarily the death of it; and that present-day merchandising is not perforce more destructive of individual enterprise than the old familiar trouble of too many retailers crowding a particular field, often spurred on by too aggressive producers, and indulging in such reckless rivalry that few made more than a bare living. Just as the shrewd retailers survived that conflict, it is contended that they can carry on as successfully now by conforming to newer conditions.

Lee of Conshohocken is one of the tire manufacturers that contend that the independent dealer need not worry overmuch about his future. True, the company says, he must sell against mail order houses, chain, department, hardware, and sporting goods stores, gasoline stations, garages that do not stock tires, automobile dealers selling spares only, service stations, factory controlled and owned stores, club and association discounts, establishments selling tires to employes at the prices they pay for them, and factory-to-user propositions. Yet there are dealers who are still in business and making money. The tire seller in that class, it is held, is usually the local representative of a company with a sound reputation; he has an exclusive franchise; he gives his customers his personal attention; and his good name is behind the product he sells.

Says Factory Backed Dealer Wins

It is claimed by Lee that in the race for business the factory shielded dealer has a decided advantage over the one left wholly to his own recourses or who confines himself to lines in which he may even have to contend with competition from manufacturers whose goods he seeks to sell. Some of those tire makers, it is held, are often so dependent on volume production that they can not wait until their dealers have absorbed all their makes and hence feel it necessary to sell "brands" to various big distributers such as mail order houses, chain and department stores, and oil companies vending tires at their gasoline stations. Such tires, frequently as good as those handled by the dealer, are too often intended for sale at a price lower than he can afford to sell them, Nor is this taking into account sales made at a good discount to utility and other corporations.

Dealers that get 100 per cent support from manufacturers, Lee says, have a big advantage over the others. Assured that their interests will be consistently promoted and protected, that the welfare of agents is the chief concern of principals, they are free of one of the worst worries and they can devote their energy to the rational development of business instead of having it dissipated in ruinous and often plainly unethical competition. Lee urges dealers to be optimistic and expresses the belief that, although the sledding may be somewhat hard for a while, it can not last long. Even the various cuts and trades going the rounds are considered but passing phases of a general movement to clear inventories of over-production.

Oil Company Sales

The distribution of tires at gasoline service stations will fail, according to William O'Neil, president of the General Tire & Rubber Co., Akron, O., who states that attempts to distribute tires through the hardware jobber, the wholesale grocer, and the wholesale druggist were not successful in the past. He further said:

"The oil companies use the same old method of figuring that was used earlier by the wholesale hardware companies. They figure that if they have so many filling station operators, they will sell so many tires a day if each operator sells one. But each operator will not sell one a day. Often he will not sell a tire a week. A commodity that costs as much as an automobile tire cannot be merchandised successfully with the methods used to retail oil and gasoline."

N. Y. Tire Dealers Reassured

At a series of conferences held in New York last month the N. Y. Tire Dealers Association agreed to certain reforms in sales policy that would effectively end the existing price war.

Telegrams were sent to the leading tire manufacturers, asking whether, in their opinion, the independent tire dealer still had his place in tire distribution. During the meeting replies were read from Goodyear, Goodrich, United States Rubber, Firestone, Fisk, and General, all assuring the tire dealers that the companies would continue to support them and considered them absolutely necessary adjuncts to the industry.

Dealers' Status in Other Lines

Retailers of rubber goods, including tires, are not alone in their wrestling with adverse trade forces. The same or similar conditions that they are called upon to meet are common in the merchandising of many other lines of goods. In the marketing of paints, for instance, as President Samuel Cabot, of Samuel Cabot, Inc., has shown, the competition from mail order concerns, chain stores, and manufacturers' branches is quite as keen as in tire retailing; yet the really enterprising retail dealers are holding their own quite well. But they do not wait for business to come to them; they go after it; and their individual efforts are often more telling than the more impersonal striving of their newer rivals for trade. The successful ones have improved their stocks and made their stores as attractive as those of the chains and branches that have invaded their fields, and they see to it that the quality of the goods they deal in is if possible a little better than that of their rivals, and prices within reasonable range. They keep overhead often lower than that of their rivals, seek cash discounts, and are alert for every other like advantage. Operating often under more flexible conditions, knowing their community intimately, carrying goods that they can guarantee unreservedly, and willing and able to render a direct, personal service that buyers can not expect from the chains and branches, the wide-awake independent, it is claimed, has a peculiar advantage over his rivals; and if he will but make the utmost of his opportunity, he need worry little about the question of surviving.

EDITORIALS

Standards Bureau's Rubber Researches

THE non-technical press, always eager for a subject for flaming headlines, may raise unduly the expectations of rubber users for a material soon to replace the familiar substance, serving so efficiently a multitude of needs, by the publication in startling fashion of a digest of an article by Director George A. Burgess, of the United States Bureau of Standards, on the laboratory production of crystalline rubber and rubber from crude petroleum. The bureau research workers, however, sought no sensation, made no promises, nor claimed priority in the discovery of rubber crystals. Nevertheless the isolation of such crystals and the indications given of their possible utilization constitute a distinct advance in the quest for knowledge of the ultimate nature and composition of indispensable substances.

So, too, while it has already been shown that rubber can be synthesized from the hydrocarbon diolefins of petroleum, the bureau takes a further step by simplifying the elaboration of caoutchouc particles from such an abundant, low-cost material. Dr. Burgess is hopeful of final commercial production of a synthetic rubber from such a source, doubtless having in mind the question of national preparedness; but he prudently refrains from giving an opinion as to how or when it or the crystalline rubber may be available for practical use. The latter, he says, if fully developed, may show quite unexpected properties. However, while the trade may for a long time have to content itself with natural rubber; yet such scientific study may one day prove as valuable to the rubber industry as any of the bureau's many helpful researches.

* * *

Competing for Talented Youth

IN POLITICS the office may not often seek the man, but among great American industries something akin to keen rivalry is developing in the securing of young men who at superior training schools show evidence of ultimately progressing under proper direction into technical executives of marked capability. Some years ago a noted manufacturing company, which largely through such means has acquired a staff of over 300 trained engineers, discovered the advantage of thus going early after promising youth instead of waiting for the latter first to graduate and then seek perhaps unsuitable jobs. Its success in thus enriching its productive and research personnel has since impelled other progressive firms to adopt a similar policy, and among them are leading rubber manufacturing companies. The results of such scouting are said to be quite gratifying.

With about 3,500 graduated annually in engineering courses and over 4,500 positions to fill, the problem of getting men is plain, and that of getting suitable men is plainer. The idea is not so much a matter of filling vacancies as of engaging men each year for places which they must develop in years to come. Risk and expense are involved in thus taking time by the forelock, but the hazards are minimized by careful study, before a position is offered, of a student-prospect's scholarship, industry, aggressiveness, common sense, leadership, personality, diversions, and outside interests. Practical experience during vacation at a plant will often enable a candidate to determine his bent for certain work as well as afford a prospective employer a fair idea of a candidate's potential efficiency.

* * *

Business Seeks the Prepared

WHILE the average producer or distributer resignedly waits for resumption of commercial activity, the progressive one takes advantage of any let-down in business to "consolidate" his position and shrewdly plans to be in the vanguard when trade is once more in full swing. He utilizes what Dr. Julius Klein, Assistant Secretary of Commerce, regards as one of the surest means for attaining such a state—advertising. Dr. Klein deplores the tendency of the timid to diminish this or other useful activities not intimately tied up with production and delivery whenever there is doubt as to the future course of business.

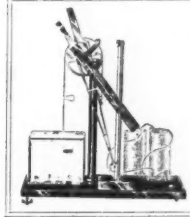
"Advertising," he says, "is inherently constructive, acting as a powerful stimulant to every branch of activity. It not only keeps goods moving—it inspires confidence. 'Good will' is a priceless business attribute, but it may sway and droop under the veering winds of public opinion. Advertising can keep it sturdy and upstanding."

He could have added that it can, too, make one of the most bankable of assets.

Roger W. Babson says, "Now, more than ever, the sales department needs every possible support. Liberal, truthful, and well-placed advertising is the most reliable tool any selling force can have in wresting profits from seemingly barren fields. The larger industrial corporations which advertise on a national scale have come to recognize more fully than have the local business men the advantage of sustained advertising in dull times. National magazine advertising for June, 1930, was 10 per cent greater than for June, 1929."

Condemning as short-sighted policy the viewing of advertising as an unnecessary expense, he says, "Instead, look at it as a vitalizing force in American business, as a key factor in mass distribution and production, as a potential stabilizer of employment, a creator of new industries, a foundation builder for future business growth."

What the Rubber Chemists Are Doing



Aging of Rubber and Its Retardation by the Surface Application of Antioxygens[1]

CHARLES MOUREU, CHARLES DUFRAISSE, AND PIERRE LOTTE[2]

THE deterioration of rubber may be due to any one or a combination of a large number of factors, such as oxidation, depolymerization, continued vulcanization, action of heat, light, etc. The present paper deals with the preservative action of antioxygens when applied on the surface of articles, and with some general remarks on the use of antioxygens.

The preservation of rubber by the use of materials having antioxygenic properties may be carried out by various methods. In all applications where it is necessary to rely upon an efficient protection of rubber, as in surgeons' gloves, gas masks, aeronautics, etc., the process offers security to the user because it assures the protection of his rubber articles.

The antioxygen deteriorates in use. The speed of deterioration of the catalyst varies according to conditions but will increase in proportion to the work it is called upon to do—that is to say, in proportion to the resistance which it must offer to a more energetic action of oxygen (highly concentrated oxygen, action of heat or light). Thus the protection given to the rubber does not last indefinitely, and it may be worth while, especially for objects exposed to heat and light, to prolong the protection by a second application of antioxygen. The process by diffusion lends itself to renewal of the protection. It alone provides a means of retarding deterioration after it has once begun.

The oxidation of the interior of rubber articles by oxygen which diffuses is not negligible. However, most of the oxidation occurs on the surface. As a matter of fact, in the vicinity of the atmosphere the oxygen will be most highly concentrated, and it is in these regions that the deteriorating action of light will occur. It is, therefore, in the interests of efficiency to have a higher concentration of antioxygen on the surface. The diffusion process fulfils this condition and thus appears to be a rational way of applying antioxygens to rubber.

It is most important to keep always in mind the important fact of inversion of antioxygen action—that is, the hastening of the autoxidation and the changes that result. A given substance should not be given as an antioxygen (or pro-oxygen) but, in a more general way, as a catalyst of autoxidation, without being precise as to the sign of the catalytic action. The sign (positive or negative) of the catalysis depends as much on the experimental conditions as on the nature of the catalyst.

There is a danger, therefore, if one does not take all the necessary precautions, of hastening the loss of the rubber objects in trying to protect them.

Antioxidant means that which opposes oxidation. It might, therefore, be thought to hinder the action of such reagents as potassium permanganate, chromic acid, nitric acid, hydrogen peroxide, ozone, etc. Considered in this sense antioxygens are not antioxidants. Many of them are even destroyed by oxidizing agents. In order to use antioxygens they must be preserved from contact with oxidizing agents.

Some errors in thought which may arise from the use of the term antioxidant are shown by the following examples:

The action of oxygen on autoxidizable substances gives as preliminary products peroxides, which are true oxidizing agents. Antioxygens are not antioxidants, but are in general unable to resist oxidizing agents and may therefore be destroyed by the peroxides. Thus an article which is to be protected against oxygen, after having been subjected to the action of the air, will need a greater proportion of an antioxygen to make up for that which will be destroyed by the peroxides already formed. With the term antioxidant there is the risk that this peculiarity will be forgotten and give rise to disappointing results.

In the rubber industry certain workers have used exposure to ultra-violet light as a test of the efficiency of protection against oxygen. The deterioration caused by ultra-violet light is probably due to the action of ozone. Now, antioxygens generally are not antiozones, but are often destroyed by ozone. It is thus a mistake to test the efficiency of antioxygens under conditions where ozone may be present. Free oxygen is the only suitable material for testing, and not any oxidizing agent chosen at random, as has been believed by certain workers deceived by the word antioxidant. The term antioxygen, precise and restricted, allows of no ambiguity.

[1] From *Ind. Eng. Chem.*, May, 1930, pp. 549-51.

[2] Organic Chemical Laboratory, College of France, Paris, France.

Surface Application of Age Resisters to Cured Rubber vs. Mill Incorporation Prior to Cure[1]

W. L. SEMON, A. W. SLOAN, AND DAVID CRAIG[2]

THE protection afforded against accelerated aging was determined by applying representative hydrocarbons, aldehydeamines, phenols, primary amines, alkarylamines, diarylamines, and thiazines to tread stock. A comparison of surface application vs. mill incorporation was made in a high-grade non-blooming tread, a high zinc oxide blooming tread, a white mechanical, and a pure-gum stock.

For most purposes mill incorporation is preferable to surface application of age resisters to rubber, although surface application will retard deterioration even after it has once commenced. No inversion of the protective action has been noted from the results of many tests with nitrogenous age resisters. It therefore appears that age resisters of the amine types are dependable for assuring protection to rubber articles.

Conclusions

If the results of bomb aging, oven aging, and sunlight exposure are compared, one is led to the conclusion that the deterioration of rubber is a complex phenomenon. The relative effectiveness of the different deterioration inhibitors varies with the test applied. The rubber technologist is interested not only in the protection afforded against heat deterioration, continued cure, oxidation of the rubber, deterioration caused by oxidized sulphur, or deterioration induced by sunlight; but also in properties such as the activation of accelerators giving rise to definite desirable types of vulcanizates, plasticizing or stiffening of the uncured stock, improved dispersion of the pigments, decreased scorching tendencies, elimination of surface tackiness caused by dry air cure, and prevention of flexure cracking in the cured product. Surface application may be effective with respect to all the properties listed in the first group, but only mill incorporation can lend the advantages enumerated in both groups. Moreover, wear will remove a large part of the age resister applied to the surface which cannot have penetrated diffusion to a concentration beyond its solubility, whereas abrasive action may expose new portions of age resister milled into the stock.

ADVANTAGES OF MILL INCORPORATION. (1) For high black stocks more effective

[1] Presented before the Division of Rubber Chemistry at the 79th Meeting of the American Chemical Society, Atlanta, Ga., April 7 to 11, 1930. *Ind. Eng. Chem.*, Sept. 1, 1930, p. 1001-04.

[2] The B. F. Goodrich Co., Akron, O.

protection is secured from mill incorporation than from surface application of age resisters.

(2) Large amounts of preservatives in the compounds may be secured by mill incorporation, thus affording protection for a longer period of time.

(3) Owing to the slow diffusion into rubber of age resisters of high molecular weight, mill incorporation may be expected to give better protection to the interior of thick rubber articles than could be obtained by surface application. This holds true especially for protection against heat deterioration.

(4) It is evident that slightly soluble materials may be incorporated by mill mixing in amounts in excess of that needed to saturate the rubber, and as the dissolved part reacts and loses its effectiveness for protecting the rubber, new portions of the excess may dissolve to sustain the protective action.

(5) Mill incorporation is much less laborious, since the material may be mixed into batches weighing 100 to 300 kg. (220 to 660 lbs.). Contrast with this the surface application to hundreds of single articles which might be produced from these batches.

(6) If the materials are incorporated on the mill, there is no loss of costly solvent, with the attendant problems of recovery and of fire and health hazards.

ADVANTAGES OF SURFACE APPLICATION. (1) Surface application is the only means by which protection with age resisters can be secured for articles containing none, either new or after deterioration has commenced.

(2) Surface application is a means of applying materials which would materially interfere with the curing or processing of the stock.

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Aging of Rubber Compounded with China Clay[1]

T. J. DRAKELEY AND P. G. PACKMAN

THE following abstracts outline the experimental method followed and state in full the authors' conclusions.

A base mix of the following composition was used throughout:

	Parts by Weight
Pale crepe	100
Zinc oxide	5
Sulphur	4
DPG	1

The clays were added in the following proportions: By weight per cent of rubber, 0, 10, 25, 35, 45, 60, and 100. By volume per cent of rubber, 0, 3.6, 8.9, 12.5, 16.1, 21.5, and 35.8.

The samples were vulcanized in a daylight press at 148° *C.* in ring molds 3 mm. thick. The optimum cured samples were aged for approximately 0, 100, 200, 300, and 400 hours in large water-jacketed ovens provided with air inlet and exit holes and maintained at 75° *C.* At the end of each of the stated periods a batch was withdrawn and tested after a rest period of at least 24 hours. All tests were made on the standard Schopper ring-shaped pieces, 3 mm. thick, 6 rings being prepared for each test, and the results averaged.

Antioxidants

It is of importance in dealing with the aging of rubber to consider the effect of antioxidants. Accordingly, a series of experiments was carried out in which two commercial antioxidants, Nonox and Agerite, were added separately to the base mix in conjunction with the three clays. The tests showed that while the addition of either of the antioxidants caused a softening of the vulcanizate and diminished the tensile strength, the maximum tensile product was given at approximately the same time of cure as for the 35 per cent clay mixing.

Conclusions

1. There was, on aging, a displacement of the stress-strain curves of the vulcanizates examined, first towards the stress axis, and ultimately in the reverse direction. This displacement was, in general, greater as the proportion of clay increased.

2. When either of the antioxidants, Nonox or Agerite, was present, the displacement was smaller, and the reverse movement of the curves commenced at a later period.

3. The rate at which the compounds aged, as shown by the fall of tensile product, was influenced to a considerable degree by the amount of clay present. Increasing quantities of this material lessened the rate of decay. The effect of each further addition was marked in the early stages of pigmentation but was less distinctly shown as the proportion of clay was raised. For amounts exceeding about 35-40 per cent, by weight, up to the highest loading examined, viz., 100 per cent, the rate of aging was approximately constant.

4. When the antioxidant Nonox was present, the clays still exerted this influence, but to a less extent. The protective influence of the pigment was apparently masked by the more powerful antiaging properties of Nonox. These results were confirmed by the experiments made with Agerite.

5. The slope of the stress-strain curves increased in all cases on aging, although with two clays there was a decrease after about 200 hours. That is to say, the rigidity, in general, decreased as aging proceeded. This effect was more marked as the proportion of clay increased.

6. The effect of antioxidant was to retard the changes in rigidity which occurred during aging.

7. Finally, it may be noted that the clays, although their influence was considerable in retarding the effects of aging, did not appear to differ greatly among themselves, so far as the retardation of aging is concerned.

[1] *Trans. Inst. Rubber Ind.*, Apr., 1930, pp. 426-41.

Behavior of Various Clays with Crude and Reclaimed Rubber[1]

H. A. WINKELMANN AND E. G. CROAKMANN[2]

CERTAIN salient points in this important study on twenty-two rubber compounding clays are brought out in the following abstracts.

The emphasis which is placed on uniformity and ease of processing of rubber compounds makes it necessary to evaluate raw materials on the basis of both the uncured and the cured properties of the compound. This study was made to show the variation produced by a large number of samples of commercial clays in crude and reclaimed rubber. It was observed that the properties of the uncured stocks in many cases showed much greater variation in hardness, feel, and processing than was predicted from the physical tests of the cured products. The influence of the clays in several cases was more marked in the uncured stock than in the cured compound.

Microscopic examination of the clays showed that there was a large variation in particle size from one sample to another. The minimum and maximum effects produced by the clays on the various physical tests may be predicted on the basis of particle-size measurements. The fineness of subdivision of a clay determines its influence on the properties of both the cured and uncured compounds. The finer the clay, the greater is its stiffening power and reenforcing effect. A microscopic examination is one of the most important tests which can be applied to clays since it enables one to make a quick classification of the material. The following table gives microscopic measurements of representative samples:

Maximum	Minimum	Average
μ	μ	μ
12	0.2	1
25	0.2	1.5
10	0.5	3
50	0.5	8
75	1.0	15

The compositions studied were as follows: Twenty parts of clay were refined with 80 parts of a standard alkali wholetire reclaim. Four parts of sulphur were

[1] Presented before the Division of Rubber Chemistry at the 79th Meeting of the A. C. S., Atlanta, Ga., Apr. 7-11, 1930. *Ind. Eng. Chem.*, Aug., 1930, pp. 865-69.

[2] Philadelphia Rubber Works Co., Akron, O.

subsequently added on a mixing mill, and slabs cured for 15, 30, 45, 60, and 75 minutes at 141.6° C.

Twenty-two samples of clay were incorporated into a compound of the following formula:

	Parts
Pale crepe	100.00
DPG	1.57
Sulphur	3.91
Heavy magnesium oxide	2.38
Zinc oxide	8.75
Clay	40.70
Stearic acid	1.54
	158.85

The compound was designed to give its maximum tensile strength in 30 minutes. Cures were made for 15, 30, 45, 60, 75, and 90 minutes at 141.6° C. This compound was chosen because the compounds in which clay is most generally used are designed for a short cure.

Study of these physical properties of these compounds is thus summarized.

Conclusions

1. The chemical analysis of clays gives but little information regarding their behavior in crude or reclaimed rubber. Acidity or alkalinity should be determined for effect on rate of cure. Color of the clay is no criterion of its purity.

2. Clays show wide variations in plasticity, retentivity, and softness in crude and reclaimed rubber.

3. Commercial clays vary widely in their effect on the physical properties of crude and reclaimed rubber. In general, the effect of the clays is the same in reclaimed as in crude rubber. There is not quite the percentage variation in tensile strength in reclaimed rubber that there is in crude rubber. The alkalinity of the reclaim may have decreased the variation.

4. Bomb aging is an important test for differentiating between various clays.

5. The uncured as well as cured properties of a compound should be noted in compounding and processing various samples.

6. Microscopic examination of clays makes it possible to predict their effect on the uncured and cured properties in both crude and reclaimed rubber.

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A. C. S. Rubber Division Meeting

AT THE Fall Meeting of the American Chemical Society held at Cincinnati, O., September 8-12, the Rubber Division sessions took place in the library building of the University of Cincinnati on the mornings of September 10 and 11. The opening session was attended by 150 members.

The chairman appointed a committee to nominate officers for the ensuing year, comprising C. C. Curtis, L. B. Sebrell, J. Harvey Doering, H. J. Conroy, and H. E. Simmons. The election resulted in the following list of officers: H. A. Winkelmann, chairman; E. R. Bridgwater, vice chairman; H. E. Simmons, secretary-treasurer; Ed. Nahm, sergeant-at-arms. Executive Committee: Chairman, Stanley Krall, G. K. Hinshaw, N. G. Madge, D. J. Beaver, and H. F. Palmer.

The divisional dinner was held on Wednesday evening, September 10, in the ballroom of the Gibson Hotel. William H. Whitcomb was toastmaster. The entertainmen was furnished by stars from WLW radio studio.

There were souvenirs of the occasion, the Godfrey L. Cabot Co. contributing an old-fashioned New England cigar lighter that "never fails," which was one friction match in a wooden case as a container. The souvenir offered by the Federal Color Laboratories, Inc., and the Rubber Service Laboratories Co. was a set of bridge cards; General Atlas Carbon Co. distributed small trays for drinking glasses, of a molded rubber composition demonstrating the pliability of Gastex and rubber in equal proportions.

The program of papers presented at the sessions of the division maintained the customary high standard set on previous occasions. Abstracts of the complete list of papers will be found in the September issue of this journal.

Future A. C. S. Meetings Scheduled

Week of March 30, 1931...Indianapolis
Week of August 31, 1931.....Buffalo
Spring of 1932.....New Orleans
Fall of 1932.....Denver

Z-88-P

The accelerator Z-88-P is replacing Z-88, which has been in use for a number of years. The improvement consists in the powdered form, which enables Z-88-P to be handled easily for weighing and milling into the batch. The change from lump to powder form does not affect the flat curing characteristics of the old Z-88. The material is excellent for use in white and works well with organic colors.

Technical Communications

New Form of Carbon Black

A NEW form of Micronex carbon black has been perfected especially for wire and cable insulation. It is known as Micronex W-5. When used in the proper way and in proper proportions, this material produces marked improvement of the dielectric properties of vulcanized rubber. At the same time the reenforcing action increases the toughness and general physical properties of the rubber product.

Care in the mixing procedure is desirable for best results. In this respect the compounder should avail himself of the special service to consumers offered by the producers who have developed this unique quality gas black.

Micronex W-5 makes possible improved dielectric strength, resistivity, and power factor. The exact proportions, however, must be worked out for each case depending on the compound. It is suggested that 10 per cent W-5 on the crude rubber plus the rubber content of any reclaim present be used as a first approximation.

By varying the proportion upward or downward the exact optimum for each electrical property will be obtained. Loadings of over 20 per cent on the rubber content have proved satisfactory. The advantages of the higher loadings are that the physical reenforcement and toughness are increased.

W-5 is suitable for both inside next to the wire and in high carbon tread type jacket stocks of wire insulation; thus the manufacturers should concentrate on this grade as a precaution against confusion of grades. Data from Binney & Smith Co., 41 E. 42nd St., New York, N. Y.

Antioxidant Comparisons

THE following summary gives the comparative efficiency of six antioxidants tested with each of three accelerators.

Treads containing Accelerator 808: Best, Neozone *A*, Neozone *C*, and Neozone *D*; second, Antox and Stabilite; third, Parazone; last, no antioxidant.

Treads containing Di-ortho-tolyl-guanidine: Best, Neozone *A*, Neozone *C*, and Neozone *D*; second, Antox; third, Stabilite and Parazone; last, no antioxidant.

Treads containing Mercapto-benzothiazole: Best, Neozone *A*, Neozone *C*, Neozone *D*, Stabilite, and Parazone; second, Antox and no antioxidant.

The aging properties of the tread containing mercapto-benzothiazole were not improved by the addition of Antox. This is thought to be due to the activating effect of Antox on mercapto-benzothiazole. Compensation for this effect was attempted but apparently the adjustment in this case was insufficient.

It is surprising that all of the antioxidants with the exception of Antox gave approximately equal results in the mercapto-benzothiazole tread, whereas in the treads accelerated with di-ortho-tolyl-guanidine and accelerator 808, Neozone *A*, Neozone *C*, and Neozone *D* were outstandingly better than the others.

It is impossible to express mathematically the results of sun checking tests, but in the following table the degree of sun checking is stated in comparative terms.

Treads containing Accelerator 808: Best, Neozone *A*, Neozone *C*, Neozone *D*, and Stabilite; second, Antox, Parazone, and no antioxidant.

Treads containing Di-ortho-tolyl-guanidine: Best, Neozone *A* and Parazone; second, Neozone *C*, Neozone *D*, and Stabilite; last, Antox and no antioxidant.

Treads containing Mercapto-benzothiazole: Best, Neozone *A*, Neozone *C*, and Neozone *D*; second, Antox and Stabilite; last, Parazone and no antioxidant.

These observations summarize the results of checking tests on five different slabs of each cure and there can be, therefore, no doubt that the relative effect of the various antioxidants in retarding sun checking is dependent upon the accelerator used.

Of the three compounds containing no antioxidant, that containing accelerator 808 showed the least degree of sun checking; that containing mercapto-benzothiazole being next; and that containing di-ortho-tolyl-guanidine last. The difference in Neozone *A*, *C*, and *D* was in all cases slight, and with all three accelerators these antioxidants definitely retarded sun checking. Parazone proved as effective as Neozone *A* with di-ortho-tolyl-guanidine but showed no value as a preventive of sun checking with 808 or mercapto-benzothiazole.

Antox has no value as a preventive of sun checking with either 808 or di-ortho-tolyl-guanidine although it appears to have some value with mercapto-benzothiazole. The results are open to question owing to its effect on the rate of cure. Stabilite proved inferior to Neozone *A* in di-ortho-tolyl-guanidine and mercapto-benzothiazole stocks but equal to Neozone *A* in the tread containing accelerator 808. Data from E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Sericite Dusting Powder for Rubber Molds

THE mineral sericite is a somewhat fibrous micaceous natural material which by reason of its irregular crystalline structure when powdered tends to be absorbed more readily into rubber than is the case with the flat or scaly form of powdered muscovite or leaf mica. At the same time sericite resists absorption by the rubber sufficiently long to be of value in facilitating the removal of trapped air at low spots on a tire for example. Generally tires dusted with sericite powder before curing come out of the mold perfectly black provided, of course, that they were black when made.

On account of the fact that sericite is completely absorbed at the end of the cure it is advisable always to use a dilute solution of soapbark on the mold in order to render the tire easily removable. Occasionally one finds that certain tire stocks absorb sericite so readily that it fails to function entirely satisfactorily in preventing air trapping. In such instances it is advisable to mix more or less of powdered muscovite with the sericite to give a powdered mixture more resistant to absorption in the rubber. The actual results obtained experimentally will determine the proper proportions of the mixed powders. Data from Whittier, Clark & Daniels, Inc., New York, N. Y.

P-33 and Thermax

THERE are four very definite reasons for the current practice of using P-33 and Thermax in good sized proportions with reclaim in mechanical rubber goods compounds. These reasons are: (1) these soft carbons facilitate mixing, tubing, and calendering and smooth out the reclaim; (2) both of these carbons, especially P-33, greatly improve the resistance to tearing of any ordinary compound; (3) the two benefits just named are obtained without any increase whatever in the volume cost of the stock; and (4) P-33 and Thermax are uniform materials and are liked for this reason. Data from R. T. Vanderbilt Co., Inc., 230 Park Ave., New York, N Y.

Breaking Down Rubber

WHEN batch size, mill speed, speed ratio, roll setting, etc., are uniform, the break down depends upon power consumption above a certain minimum. Rubber gives most resistance to motion when cold. For this reason power consumption and break down are most rapid when the rubber is kept cold. Therefore, the first few minutes of milling cause the most break down. As milling proceeds, the temperature increases; and the resistance offered by the rubber is less, and the energy consumed becomes less.

Increased softness, due to temperature increase and plasticizing action of the mill, finally reduces the rubber to such condition that power consumption has reached the minimum which permits the rubber to flow on the mill without further breakdown.

Accordingly, under factory conditions 12 minutes' milling, followed by a cooling period during which the rubber is removed from the mill and again followed by a 10-minute milling period will produce rubber much softer than that produced by a straight period of 22 minutes' milling.

The following factors tend to cause high energy consumption and produce the softest rubber:

Milling as cold as possible.

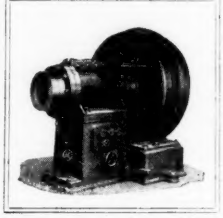
Energy consumed per pound of rubber is greater for small batch than for a large one.

Rubber which lies in a large bank can be neither cooled nor broken down.

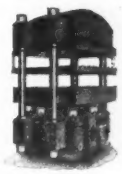
Adding softeners toward the end of the milling period. This also applies to accelerators which soften, such as the guanidines and most aldehyde amine products.

If very soft rubber is required, coordinated periods of double massing are more effective and save time.

The distance between the rolls can be greater for mills having high ratio between the surface speeds of the rolls.

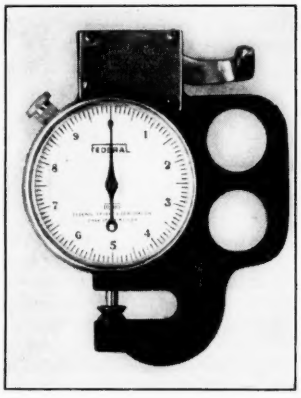


New Machines and Appliances



Dial Thickness Gage

THE illustration pictures a new model of pocket dial thickness gage with indicator graduated to read to .0001 of an inch. The instrument is furnished with either jewel or plain movement as desired. It is convenient for measuring the thickness of all kinds of flat material such as rubber, etc. The tension spring can be



Federal Thickness Gage—Model 390

altered to suit various needs. The spindle is raised by pressing down on the small lever at the top of the instrument. The reading is adjusted to zero by turning the knurled bezel ring, which is then clamped against accidental movement by the small thumb screw at the side. An instrument of this sort is found particularly convenient in calender, cutting, and cost departments for checking stock gages. Federal Products Corp., Providence, R. I.

Printers' Roller Polisher

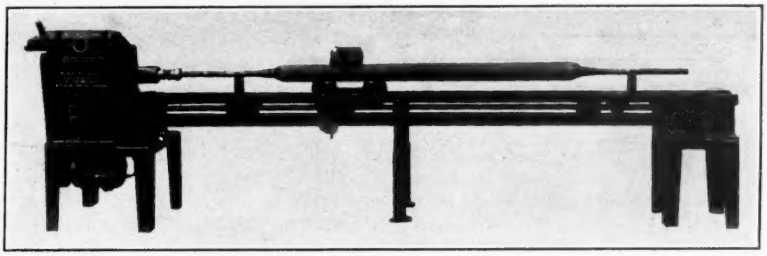
THE customary glue composition printers' rollers are being rapidly displaced by special soft rubber rollers. This new type requires special grinding and polishing facilities to prepare and maintain them in working condition. The grinder was described in INDIA RUBBER WORLD, May 1, 1930.

The machine here pictured and described is specially designed and built to polish the ground rubber rollers. The polishing effect is obtained by a flexible concave spring pad carrying selected grades of abrasives mounted in strip form. The pad automatically passing back and forth on the surface of the rapidly rotating roller produces a finely finished surface. The pad action simulates that of applying an abrasive cloth by hand.

The machine construction and operation are as follows: It is driven by a 2 h. p. motor located directly underneath the head. A Tex-rope drive from the motor to the head conveys the power to a four-speed transmission that is automatically drenched with oil contained in the head stock housing. Flexible and chucking connections are used for holding and driving the end of the roller shaft.

The roller is placed in a pair of laterally adjustable *V* blocks that are lined with oil impregnated wooden blocks. The carriage which contains the pad is automatically fed backward and forward by a specially designed endless chain driven from the head stock. Two adjustable tripping devices are mounted on guides at the back and set so that the polishing pad will travel back and forth. The reversing of the carriage is done by an automatic load and fire mechanism that is tripped by the adjustable stops.

The machine is about 14 feet long, 3 feet wide, and 4 feet high and weighs approximately 2,000 pounds. Two or three strips of different grades of abrasive material are wound into a roll mounted on the carriage in order that the change from one grade of abrasive to another can be made rapidly; thus the abrasive material may not be wasted, and worn portions may be pulled slightly forward and torn off. The Black Rock Mfg. Co., Bridgeport, Conn.



Egnor Printers' Roller Polisher

Three-Position Pilot Switch

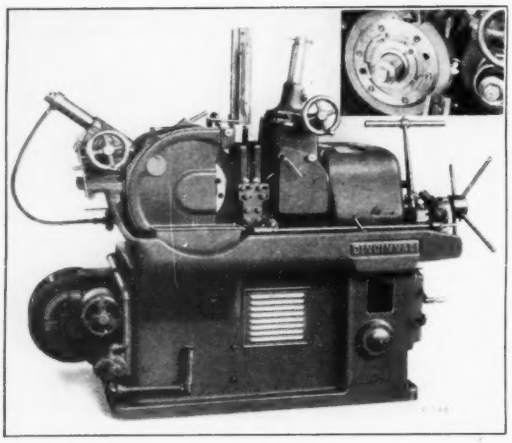
MOTOR-DRIVEN pumps, compressors, and similar machines which are controlled by an automatic pilot device such as a float switch, pressure switch, time clock, etc., often require some means of starting and stopping the motor manually. For this purpose a new three-position pilot switch, here pictured, has been developed. The operating lever can be placed in the "automatic," "off," or "manual" position. When turned to "automatic," the automatic pilot device is in circuit and normal automatic operation is obtained. With the lever in the "off" position the pilot circuit is opened and the motor cannot be started from any other

C-H 3-Position Pilot Switch

control point. Turning the lever to the "manual" position closes the control circuit direct, and the motor will run continuously regardless of any other control devices as long as there is operating voltage on the line. The construction is extremely simple. It consists of a two-button push-button switch inside the case, the buttons of which are operated by a cam attached to the operating lever. The lever will remain in any one of the three positions. Cutler-Hammer, Inc., Milwaukee, Wis.

Grinder for Spherical Work

ONE of the latest developments in the field of centerless grinding is the finishing of spherical work. Balls of hard rubber, casein, bakelite, metals, and glass are ground by the centerless method in sizes ranging from ¼-inch to 4 inches in diameter. The advantages resulting from the centerless grinding of balls are a high degree of accuracy and finish and uniform roundness. The roundness of the balls is held within limits of



Centerless Ball Grinder. Insert Shows How a Pool Ball Is Ground

0.002-inch, an accuracy unsurpassed.

The fundamental principles that apply to all grinding operations performed on the centerless type of machine built by Cincinnati Grinders, Inc., Cincinnati, O., are employed in grinding balls, although the regulating or feed wheel is arranged differently. As illustrated in the picture, the grinding and regulating wheels are both trued radially for ball grinding. Then, also, in order to generate a true sphere on each ball the regulating wheel is mounted on a special collet at an angle of 12 degrees to the axis of the regulating wheel spindle. This arrangement produces a constantly varying inclination of the regulating wheel relative to the grinding-wheel axis as the regulating wheel spindle revolves.

Casein pool balls are ground by means of the simple set-up shown in the picture inserted in the upper right corner. Each ball is placed on a work support blade in the groove of the grinding wheel. It is interesting to note that the stripe and the number of the ball are not removed in the grinding process because they are molded through the ball.

A feature of this equipment is a hydraulic loading attachment. The work is placed on two fingers of this attachment and lowered to the work-rest blade between the grinding and the regulating wheels, by imparting a slight movement of the hand in-feed lever to shift a hydraulic valve. By continuing the movement of this lever the in-feed slide is advanced toward the grinding wheel for the operation.

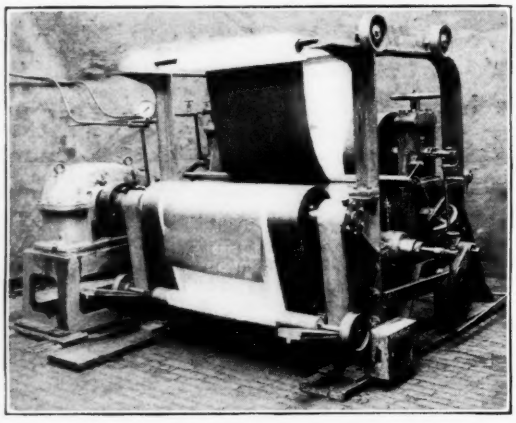
After the grinding has been completed, the hand lever is returned to the starting position; the regulating wheel backs away; the hydraulic valve is reversed; and the finished work is lifted from between the wheels to the original position.

With this particular arrangement the work is placed in the fixture and removed manually, but all other operations are automatic. These balls are ground in two operations, the total stock removed being from 0.008- to 0.010-inch. Roundness is held within 0.0002-inch and the diameter within plus or minus 0.0005-inch. A production of ten pieces a minute is obtained in each operation.

A significant feature of this operation is the use of a standard machine with special attachments, which demonstrates the versatility of the centerless method of grinding.

Vulcanizing Machine

THE machine here pictured is designed for continuously vulcanizing rubberized fabrics, matting, and similar yardage rubber products. The essential feature of the machine is the central heating drum upon which the curing is effected. The surface of the drum may be smooth polished or engraved in accordance with the intent or purpose of the goods to be cured. The normal diameter of the curing drum is about twenty-seven inches, but may be as much as five feet. The usual working width of the drum is about four feet, and it is journaled in two heavy frames so that it can be exchanged without difficulty.



Berstorff's Continuous Sheet Vulcanizer

The material to be cured is wound on a shell supported in the notched top rail of the machine. The speed of delivery of the material into the machine is regulated by a band brake as it passes over one or more freely revolving rollers supported above the machine. A pressing drum is located directly above the curing drum; provision is made for regulation of the desired pressure to be applied to the goods while curing. Two guide rollers are located beneath the curing drum, one of which is fitted with a tension device.

The driving drum is mounted in front of the curing drum in a fixed position and is direct driven by a motor through a reduction gear unit. An endless rubber apron conveys the fabric to be cured around the guide drum, and serves as a tension device to press the goods firmly during the cure. The vulcanized fabric is received on a take-up in front of the machine, the speed of which is adjusted to keep that of the fabric constant. The working speed depends upon the thickness of the rubber being cured and its curing sensitivity. Hermann Berstorff Maschinenbau-Anstalt G. m. b. H., Hannover, Germany.

Pneumatic Tire Detreader

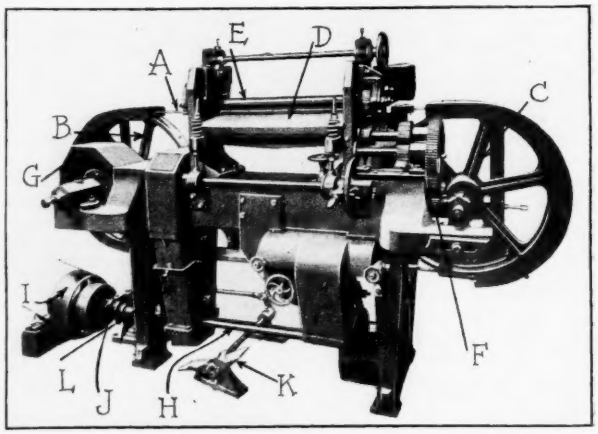
THE utilization of debeaded pneumatic and truck tires by splitting them apart requires a machine designed especially to slice the rubber tread into sheets of various thicknesses and to split the carcass fabric into different plies. A machine to be successful for this operation should be strong, powerful, and accurate in order to meet the exacting conditions of the work.

Such a machine is shown in the illustration, the essential feature of which is an automatic endless band knife *A* that runs around flywheels *B* and *C* and is guided between two plates of hardened steel.

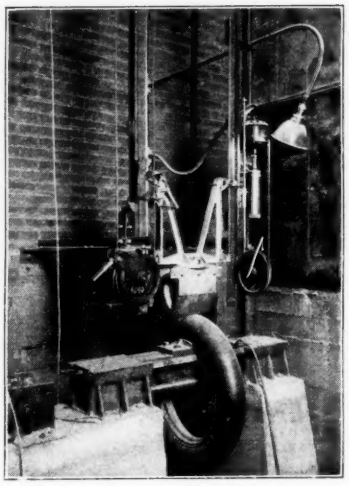
The material to be split is placed on the table *D* and caught between two driving rollers, the uppermost of which, *E*, appears in the picture. These rollers, driven by gearing *F*, feed the material against the band knife. The latter is driven by conical pinions *G* on one end of the main shaft at the opposite end of which is a pinion for driving the gearing *F*.

The main shaft *H* is belt driven by the pulley *I*, the power being engaged and disengaged by a clutch *J* operated by foot treadle *K*. A silent chain encased at *L* transmits the power from the main shaft to the operating mechanism of the machine.

For splitting large sized pneumatic tires the lower gripping roller is made concave to receive the heavy tread of the tire and



Peerless Tire Slicer



Goodrich Airplane Tire Tester

insure uniform compression of the material. The same roller, but with different profile, is equally practical for working on the extremely flexible balloon tires.

If accurate separation is required, the feed roller is covered with soft rubber to accommodate any irregularities of the material being cut. This machine is suited for slicing crepe rubber, cork, felt, leather, etc., as well as pneumatic and truck tires. Jacout & Breton Fres., 31 Route D'Arras, Thumesnil - Lez - Lille (Nord), France.

Airplane Tire Tester

THE testing machine shown in the illustration was devised for determining the strength of airplane tires under heavy loads comparable to the blow received by tires from a machine striking a hard or irregular runway at landing speeds.

The machine consists of a vertical guide track 100 feet high, down which a known weight is dropped onto a mounted and inflated tire. Exact speed of the weight in dropping from an established height is recorded on a rotating cylinder operated by a synchronous motor. The slope of a line made on the graph by an indicator attached to the weight carriage is used to calculate the speed.

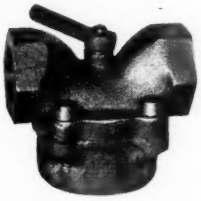
The weight has a maximum speed of 50 miles an hour in dropping. Various types and shapes of detachable weights are used to represent the many obstacles encountered in practical experience. Flat plates are used where tests concern landing on hard surfaced runways and to test for standing loads.

By making several tests on a single tire with various weights and speeds it is possible to obtain accurate laboratory tests comparable to service conditions, and the result can be used to determine the best tire materials and constructions.

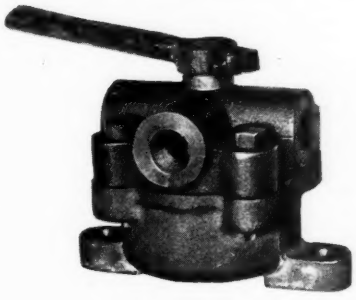
The illustration shows the machine located at the bottom of a 100-foot elevator shaft. The vertical track on which weights are guided down the shaft is seen extending up in the center. The weight carriage and the attached weight are resting on an inflated airplane tire. The synchronous motor and the rotating cylinder on which the graph is placed to determine speed are shown on the right. The indicator at the left of the cylinder is struck by the weight carriage arm and marks a line on the chart from which the speed is determined at time of contact with the tire. The scale is shown on the right over the wheel to determine actual height of weight before dropping. The weight raising apparatus and the trip rope are shown at the left. The B. F. Goodrich Co., Akron, O.

Nopak Air Valves

IT IS said that air leaking through an opening .003 of a square inch in area at 125 pounds' pressure per square inch costs from $20 to $28 per month. In other words, it costs more to waste air than to waste gas, water, or steam. Therefore, non-leakable air valves are desirable on compressed air lines and represent an economy of especial interest in rubber manufacturing plants.



Straightway



Four-Way

Nopak Air Valves

The valves here pictured, both straightway shut-off and four-way, are of a design and a construction that embody the following advantages. They are positively leakproof; the seat is protected whether the valve is open or closed; they will not stick and are easy to operate; they embody a throttling feature and have no packing to loosen and cause leaks. Galland-Henning Mfg. Co., Milwaukee, Wis.

Portable Tiering Conveyer

THE TwinVeyor is a new portable, flexible, power-driven elevating and tiering conveyer that uses a new principle —two external spiral tubes are revolved toward each other by a power head. Anything placed on the conveyer travels forward rapidly, perfectly balanced. It handles raw materials and finished products in bags, bales, and bundles. The equipment finds other applications handling crates and boxes, and experiments are being made in handling finished products without packaging, where their shape and size permit the spirals to get hold of them.

The equipment has been used for some years in sugar refineries in California and Hawaii. There it has achieved remarkable cost reductions in handling the product. It carries bagged sugar up a 30 per cent grade at the rate of 90 feet per minute, handling 1,800 bags per hour.

A standard unit consists of six 8-foot dual sections and a power head. Each section is light and joins to the assembly with an automatic lock. It is easily shifted about by one man, and an entire 50-foot line can be assembled or disassembled in six minutes. Flexibility is secured by the ability of any joint to take a 15 degree angle horizontally or it may be tilted 15 degrees up or 10 degrees down. In the elevating operation sections may be supported by the material that has already been stacked.

A hurdle section permits any number of 50-foot units to be hooked together forming a continuous line of any desired length. The traveling load hurdles each power head in the line. Right and left spiral chutes are provided for shunting the load from one line to another without manual handling, thus making right angle turns simple.

An extension cord attached to the power head may be plugged into any power line. The flow of power along the entire TwinVeyor is smooth and constant. Two complete 50-foot TwinVeyors, disassembled in 15 minutes, can be loaded onto one factory trailer. Power head section weighs 365 pounds, each 8-foot dual section, 140 pounds, entire 50-foot assembly 1,205 pounds. Clark Tructractor Co., Battle Creek, Mich.

TwinVeyors Stacking Bagged Material

Editor's Book Table

New Publications

Binney & Smith Publications: "Twenty Years With Micronex." Binney & Smith Co., 41 E. 42nd St., New York, N. Y. This pamphlet was published on the golden anniversary of the company, which seemed a fitting time to review the two decades of service of their famous Micronex. The account of the firm's participation in the first use of carbon black in the tire industry, the development of the supply, and their service to the rubber industry are briefly and clearly recounted. Research development, service, and control of Micronex are outlined. The important method of rubber testing the product in their field laboratories to control uniform grade of product is illustrated and described.

"Carbon Black in Rubber Insulating Compounds." Reprint of a paper by W. B. Wiegand and C. R. Boggs, which discusses the improvement secured in electrical insulating values by the use of properly made and dried carbon black.

"Equivalent Cure Chart." This is a practical nomographic chart and memorandum for chemist and compounder.

"Special Announcement on Control Testing of Micronex." A four-page bulletin that sets forth the value of volatile content tests and the adsorption test. These tests are rated subsidiary to rubber testing as a method for controlling the quality of carbon black.

"Bristol's Air Operated Controller Equipment. Instrument Section, Catalog 4,000." The Bristol Co., Waterbury, Conn. This 20-page booklet contains concise illustrated descriptions of the complete line of air operated control instruments designed for use in many industries including rubber goods manufacturing.

"Practical Sales Promotion Plans." The Oak Rubber Co., Ravenna, O. This attractive and profusely illustrated brochure contains many helpful hints on the value of balloons in advertising and suggests plans for developing the idea. Publicity souvenirs, balloon races and hunts, special event programs, etc., are a few of the possibilities. An insert lists many prominent users of advertising balloons, including Firestone, Goodrich, Goodyear, U. S. Rubber, Fisk, Federal, and Hood.

"Year Book, August, 1930." American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa. This volume comprises lists of officers, members, committee personnel, and regulations governing the activities of the society. A complete list of standards and tentative standards is included.

"Rubber Sundries—Catalog No. 30." Acushnet Process Co., New Bedford, Mass. This 18-page, loose-leaf catalog, illustrated in colors, shows a variety of Pastel, Xtrawear, Apco, and Goodwear Lines of druggists' sundries.

"'U. S.' Rubber Footwear Catalog—1930." United States Rubber Co., Footwear Department, Naugatuck, Conn. Many illustrations, some in colors, in this 32-page catalog show a great variety of "U. S." boots, galoshes, and rubbers for men, women, and children. Notes are given also on style, sizes, and colors.

"Eyes Saved in Industry." The National Society for the Prevention of Blindness, 370 Seventh Ave., New York, N. Y. How more than 10,000 eyes and at least $46,000,000 were saved in two recent years among 583 plants, employing a total of half a million workmen, is told in this report of a joint study by the National Society for the Prevention of Blindness and the National Safety Council. The survey analyzes records kept by corporations during 1926 and 1927, disclosing that in addition to the financial economy 2,757 men and women were saved from serious injury or total blindness in both eyes during the two years by the use of goggles or headmasks. There were 4,654 recorded instances of workmen being saved from a similar fate to one eye, making a total of 10,168 eyes saved from destruction or serious injury.

"Falk Parallel Shaft Speed Reducers, Bulletin 230." The Falk Corp., Milwaukee, Wis. This catalog describes the complete standardized line of parallel shaft herringbone speed reducers carried in stock by the company. The bulletin is immensely interesting and informative for all industrial power engineers. It is replete with suggestions, tabulated data, and illustrations of applications.

"The Hydraulic Press." The Hydraulic Press Mfg. Co., Mount Gilead, O. No. 6 in the series contains illustrated descriptions showing the application of various types of hydraulic presses in a number of manufacturing industries. The newest type of hydraulic power press, which combines the speed of the mechanical press with hydraulic smoothness and flexibility, is described in its various forms.

"Airwheels for Airplanes." The Goodyear Tire & Rubber Co., Akron O. This booklet of 24 pages gives a comprehensive description of the revolutionary pneumatic airwheel or tire for the landing gear of airplanes. A number of pictures, blueprint drawings, graphs, and tabulated data make clear the application and advantages of the airwheel, of which the tire, as a matter of fact, is substituted for the usual airplane wheel construction.

"Rubber Research Scheme (Ceylon) Second Quarterly Circular for 1930." The Ceylon Rubber Research Committee, Imperial Institute, South Kensington, London, S.W. 7, England. This circular comprises the minutes of the eighth general meeting of the Rubber Research Scheme and three reports as follows: 1. The Market Possibilities of Fractionally Coagulated Crepe. 2. Preliminary Investigation of the Effect of Different Conditions of Storage on the Hardness of Raw Rubber. 3. Sulphur Dusting as a Means of Controlling Oidium.

Book Reviews

"Handbook of Chemistry and Physics." A Ready Reference of Chemical and Physical Data. By Charles D. Hodgman and Norbert A. Lange. Fourteenth Edition, 1930. Chemical Rubber Publishing Co., 1900 W. 112th St., Cleveland, O. Flexible leather, 1386 pages, 4⅛ by 6¾ inches. Price $5.00.

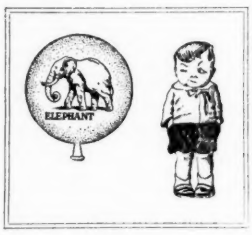
The general features and scheme of arrangement of former editions have been retained in the fourteenth. A large variety of new material appears for the first time in this edition. The new matter comprises 172 pages of tables and text.

"Five Years of Research in Industry, 1926-1930." A reading list of selected articles from the technical press. Compiled by Clarence J. West, director, Research Information Service for the Division of Engineering and Industrial Research, National Research Council. National Research Council, 29 W. 39th St., New York, N. Y. Paper, 91 pages, 6 by 9 inches. Price 50 cents.

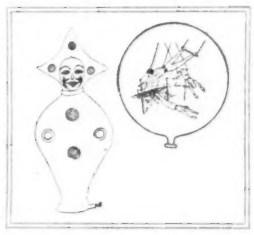
This compilation of selected articles from the technical press on industrial research activities covers a wide range of more than 80 industrial branches. The articles included in the references provide answers to vital questions on the value of research, and how research laboratories should be organized and operated in specific industries.

White Factice

It is said to be possible to make a white or rather a very light colored factice by the hot method. China wood oil is used instead of rapeseed oil, and the resulting factice can be used exactly as an ordinary brown factice except that it can also be employed in white and light colored goods. (R. M. Ungar in *India Rubber J.*)



New Goods and Specialties



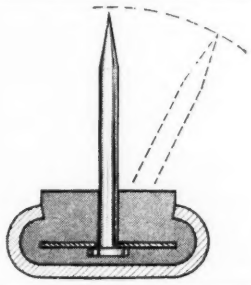
Rubber Apron

THE German utility apron here shown has several good points to recommend it. It is ample and sturdy, promising efficient protection to the busy housewife. Although inexpensive, its durability is claimed to be unlimited. Finally, a good fit is doubly insured: first, by the fact that it can be had in various sizes, and second, because the rubber bands passing over the shoulders and about the waist at the back are made, with the aid of conveniently placed snap-buttons, to be adjusted to suit the wearer. The illustration shows the novel fastening both opened and closed. The apron is produced by the hot-cure method and comes in various solid colors: red, blue, brown, silver-grey, and green. C. Müller Gummiwaarenfabrik A. G., Berlin-Weissensee, Germany.

Apron and Its Novel Fasteners

Rubber Absorbs Noise and Saves Furniture and Floors

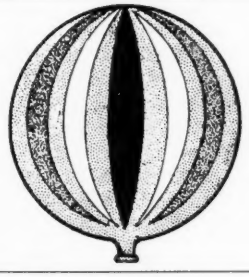
RUBBER propaganda constantly emphasizes the fact that the condition of the rubber industry would be materially improved if new uses of rubber were developed and widespread. Certainly the home and the office offer a wide field for increased usage of the product. One such means is here illustrated and described, the Darnell perfect noiseless glide. It is especially designed for places where quiet is essential. For the manufacturer states that this glide absorbs noise on hard floorings and adds years to the life of floors, floor coverings, and furniture. The broad, smooth, hardened steel base permits easy movement of the furniture on which these glides may be installed. The soft resilient rubber cushion absorbs noise and vibration caused by moving furniture. The steel washer molded in the rubber prevents the nail from pulling through and also prevents the base from pulling loose from the rubber cushion. The flexible construction of the glide allows the chair to be tilted while the glide remains flat on the floor. This obviates pitting and denting of floors and floor coverings. The glide comes in three sizes: N-1-S, 7/8-inch; N-2-S, 1 1/16 inches; and N-3-S, 1¼ inches. Perfect Caster Mfg. Co., Long Beach, Calif.



Darnell Perfect Noiseless Glide

New Toy Balloon

BRILLIANT stripes play a large part in the decorative scheme of the new balloon released by The Oak Rubber Co., Ravenna, O. This new toy, appropriately named Radiant Balloon, boasts eight stripes printed in two and three colors, which extend from the top center of the balloon down the sides. The various hues in which these stripes are printed combined with the bright tones of the balloons themselves make a highly colorful product.



Radiant Balloon

Holeproof Markets New Type Men's Hose

SELF-SUPPORTING men's hose which stay up on the leg by means of an elastic band at the top edge are announced by the Holeproof Hosiery Co. Marketed under the registered name of Autogart, the innovation is experiencing remarkable success, according to the manufacturer.

The band which supports them is made of a new kind of rubber. It is only recently that rubber able to stand washing and wear without deteriorating has been perfected by the rubber industry. This band remains soft and elastic as long as the sock lasts.

Autogart with an Elastic Band at Top

THE "SAV-KAP" COMBINATION BOTTLE stopper and opener is a clever device for sealing crown-top bottles. A heavily nickeled cap has a projection on opposite sides which clamps down over the edge of the bottle. One of the projections is elongated to form a handle or lever with which to open the bottle capped with it. The sealing feature is supplied by a molded disk of black rubber which fits inside the cap. National Co., Inc., 61 Sherman St., Malden, Mass.

Obituary

President of Standard Tire Co.

FOLLOWING a heart attack Robert J. Firestone, president of the Standard Tire Co., Willoughby, O., died on September 1. He was a brother of Harvey S. Firestone, president of the Firestone Tire & Rubber Co., Akron, O., and until 1919,

R. J. Firestone

when he organized the Standard company, Robert Firestone was vice president and general sales manager of his brother's company.

He was born in Columbiana, O., on June 21, 1873. At twenty he became associated with his brother Elmer in the buggy business at Des Moines, Iowa. When Harvey Firestone went to Chicago in 1895, he joined him there as a salesman, both returning to Akron to organize the present Firestone company in 1900. He was first appointed Chicago branch manager, coming back to Akron in 1907 to be general sales manager. In 1916 he was elected vice president.

R. J. Firestone was a director of the finance committee of the National City Bank, Cleveland; vice president and director of the U. S. Motor Truck Co., Covington, Ky.; and a trustee of the McCormick Theological Seminary, Chicago. He was a member of the Union Club and Mayfield Country Club, Cleveland.

Funeral services on September 4 were conducted by Rev. Percy E. Erickson, friend of the Firestones, at the Firestone residence, 15900 S. Park Blvd., Shaker Heights, Cleveland, O. Interment was at Columbiana.

Mr. Firestone is survived by his widow and three daughters.

Charles R. Wolf

HEART disease claimed Charles R. Wolf, sixty, on September 10 at his home, Turkeyfoot Lake, O. For many years prior to his retirement on July 1, 1926, he had been purchasing agent for The B. F. Goodrich Co., Akron, O. His thirty-two-year association with the rubber company began on November 24, 1894, when he was taken on as an office boy. Gradually he worked himself up to the position of purchasing agent.

Probably his most outstanding characteristic was his ability to make friends. Salesmen enjoyed calling on him, and they always received courteous and fair treatment. Many will mourn his loss.

Funeral services were conducted at Billow's Chapel on September 12. Burial was in Glendale Cemetery.

Mr. Wolf was an Elk. He never married, and one brother survives him.

Inventor of Rubber Latex Paper

THE well-known rubber chemist, Frederic Kaye, 64, died on August 7. He was particularly noted for his discoveries in the use of rubber latex in paper manufacturing.

Mr. Kaye began his scientific career in 1892 when he obtained an associateship in chemistry at the Royal College of Science, London. For about five years he was lecturer and demonstrator in physics at the Technical College, Bradford. In 1902 he joined Dr. Philip Schidrowitz as colleague and associate in research work in the rubber industry. For six years Mr. Kaye conducted a practical school of rubber at the Northern Polytechnic Institute of Rubber, London, and in 1918 signed with the research department of the War Office, on balloons at the College of Technology, Lancaster, becoming in 1920 a lecturer on rubber.

He is survived by one daughter.

Veteran Rubber Man

AFTER an illness of many months William A. Robbins, superintendent of The Industrial Rubber Goods Co., St. Joseph, Mich., died on September 11. His association with the rubber industry covered about thirty-five years with the following concerns: The Goodyear Tire & Rubber Co., Akron, O.; the Combination Rubber Manufacturing Co., Bloomfield, N. J.; the Republic Rubber Co., Akron; and The Industrial Rubber Goods Co.

Burial took place in Trenton, N. J., on September 13.

Vice President of Kelly-Springfield Tire Co.

WHILE visiting a friend, Thomas S. Lindsey, vice president and general sales manager of Kelly-Springfield Tire Co., died suddenly after a heart attack on September 15. He became associated with Kelly-Springfield about eighteen years ago as manager of the New York branch. Later he took over sales activities, becoming in turn special representative, assistant sales manager, general sales manager and vice president in 1926.

Prior to joining Kelly-Springfield he was with the Diamond Rubber Co. and previously to that with the Pennsylvania Railroad.

Mr. Lindsey was born in Holmesville, O. He belonged to the Masonic order, the Lotos Club, New York, and the Dunwoodie Golf Club, Yonkers.

T. S. Lindsey

He was an indefatigable worker and a born salesman, who knew his job and his territory thoroughly. His death is a great shock to his host of friends and business associates.

His wife and four children survive him.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

Number	Inquiry
1289	Manufacturer of rubber pattern letters to be used on glass during a sandblasting operation.
1290	Maker of hospital door silencers.
1291	Manufacturer of rubber and chenille mats for the bathroom.
1292	Manufacturer of rubber corset material with silk on both sides.
1293	Manufacturer of liquid rubber for surfacing tennis courts.
1294	Manufacturer of B-1 Dye.
1295	Manufacturer of rubber trays for refrigerators.

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Number	Special Circulars
2772	British Exports of Automobile Casings, June and First Half, 1930.
2774	British Exports of Automobile Tires and Inner Tubes, First Three Months, 1930.
2775	British Exports of Footwear, June and First Half, 1930.
2777	French Tire Exports, June and First Half, 1930.
2780	French Footwear Exports, June and First Half, 1930.
2783	Comparative Exports of Boots and Shoes from United States, Canada, and United Kingdom, First Half, 1930.
2784	German Tire Exports, First Half, 1930.
2786	United States Crude and Reclaimed Rubber Survey, First Six Months, 1930.
2788	Crude Rubber Reexports from the United States, July, 1930.

The Rubber Industry in America

OHIO

Wm. O'Neil on Success

What spells success in the tire industry?

Does successful tire manufacturing mean, necessarily, a huge annual volume of production?

"No!" says William O'Neil, president of The General Tire & Rubber Co., Akron, O. "Don't take foolish business. On the other hand, don't pass up close business even if it shows only a small profit when everything is taken into consideration, provided that business does not interfere with your regular outlets.

"Take the matter of plant investment. Let's consider two companies—General and one of the other larger companies.

"General has a fixed investment of about $1,500,000 in its plant. Figuring annual depreciation at 10 per cent and interest on the investment at 6 per cent, that makes 16 per cent on $1,500,000 or $240,000 a year, which would be figured in merchandising terms as a merchant's rent. General's rent would be less than one per cent of its annual business.

"If the other company has a plant investment of $102,000,000, it must figure its annual rent at about $16,000,000, 6 per cent of its annual business. While this other company's business is not confined to tire sales, its other lines, compared with other companies making those lines, require less of an investment than its tire industry.

"General does not make any other lines of tires and does not have in its line a tire that sells for 15 per cent less than its regular line. This is the worst kind of competition that a tire dealer can have—competition within his own store."

Firestone Activities

The Firestone Tire & Rubber Co., Akron, O., plans to resume operating on a basis of four or five days a week to reduce stocks to the lowest possible point by November 1. The factory has been running twenty-four hours a day, six days a week, since reopening on July 28, after a one-week shut-down for vacations. With stocks reduced around November 1 the company will start to build up stocks and give employes as much work as possible during the Winter.

The company announced also a 10 per cent decrease in salary starting on September 1. This cut will affect all office and salespeople. Several weeks ago all higher salaried employes of the Firestone concern, receiving $3,000 or more, were cut 10 per cent.

Africa has been modernized. Consider Monrovia, capital of Liberia, situated on the west coast of Africa and headquarters of the Firestone Plantations Co. Monrovians receive their daily news from the United States—4,400 miles from New York—faster than any newspaper subscriber. This is made possible by the United States-Liberian Radio Co., operating a short wave public utility between Liberia and the United States. Letters to Monrovia reach their destination in approximately six weeks by boat. Radio communications are received in a clap of the hand. There are churches, hospitals, schools, modern homes; work has been provided for thousands of natives; and electric lights and refrigeration have erased the last trace of the jungle.

These changes have occurred since Harvey S. Firestone determined to grow his own rubber and free America from foreign rubber monopoly.

Goodyear Operations

The Goodyear Tire & Rubber Co., Akron, O., last month announced the sale of its rubber tire chains to the United States Chain & Forging Co. In its new ownership it will be known as the McKay rubber tire chain and will retain all advantages and features as when made by Goodyear. In announcing the sale, M. K. Moore, accessories sales manager of Goodyear, stated that the new distributer would fill immediate orders with Goodyear chains, and later on will have its own McKay rubber chain.

Fred W. Climer, Goodyear personnel manager, sailed last month for Buenos Aires, Argentina, where he will be general superintendent of the Goodyear plant there, work on which started July 1.

Effective September 1 the company announced a 20 per cent reduction from the peak in the number of salaried employes. This represents an effort to bring down administrative costs more nearly in line with the total volume of business for the year. It is reported that the Akron plant will curtail tire production from 144,000 tires daily to a 30,000 schedule.

The company announced also a 10 per cent salary cut for all sales and office employes to "merely parallel the wage adjustment in the factory," according to President Litchfield. All these cuts enabled the company, he further declared, to retain as many as possible on the payroll.

The International Gordon Bennett Balloon Race held last month was won by the Goodyear VIII piloted by Ward T. Van Orman, and his aide, Alan McCracken, winners of the 1929 race, flying from Cleveland, O., to Canton Junction, Mass. The City of Cleveland, piloted by Roland Blair and his aide, Frank Trotter, 1930 U. S. National champions, also of The Goodyear Tire & Rubber Co., was disqualified after 360 miles when it struck a tree and tore its bag.

American Zinc Sales Co., of the American Zinc, Lead & Smelting Co., Columbus, O., through Thornton Emmons, vice president in charge of sales, has announced the appointment as assistant manager of sales of Frederick W. Knoke, formerly western district manager. He will continue his headquarters at the company's office in the Paul Brown Building, St. Louis, Mo.

P. H. Hart, former treasurer of The Goodyear Tire & Rubber Co., Akron, O., according to the incorporators of the Kenton Oil & Gas Co., recently incorporated in Ohio, will be president of the new company.

The Motor & Equipment Association will hold its annual exposition in Cleveland, O., November 10-14. Interest is running high, and the committee expects this year's affair to be the most extensive ever sponsored by the M. E. A. To date the contracts received for exhibition space exceed those received up to a corresponding time last year by more than 30 per cent. Requests for hotel reservations at Cleveland indicate that jobber members, invited jobbers, and foreign distributers will attend in large numbers.

The Master Tire & Rubber Co., a manufacturing and holding company, according to current reports, has purchased the controlling interest in the Giant Tire & Rubber Co., Findlay, O.

George Schoenfeld, of Schoenfeld Bros., Pantin (Seine) France, manufacturer of molded druggists' sundries, visited the rubber factories in Akron, O., last month.

The Board of Education, Akron, O., next month on the sixtieth anniversary of the founding of The B. F. Goodrich Co., Akron, will honor its founder, Dr. Benjamin Franklin Goodrich, by dedicating the city's most modern public school to his memory.

The B. F. Goodrich Co., Akron, O., according to a recent statement of President James D. Tew, will not reduce salaries at present.

The Seiberling Rubber Co., Akron, O., effective on September 1 reduced salaries generally about 10 per cent. Vice President C. W. Seiberling declared that in some instances the cut was greater than 10 per cent but that there is no immediate prospect of reducing the number of employes. F. A. Seiberling recently was honored by being made a lifelong member of the Rice Foundation in recognition of his character and achievements "in

building the prestige of our country and as an inspiration and incentive to present and future generations." Dr. Rice revealed that Mr. Seiberling's name had been suggested for life membership in the society through questionnaires mailed to several hundred prominent men in Akron.

Letters from Our Readers

Rubber Goods Factories in Malaya

To the Editor:

Dear Sir: I read with interest your note on page 91 of the September issue of India Rubber World with reference to rubber goods factories in Malaya.

It has always been a great source of wonderment to me that the rubber industry has not seen the possibilities in this country. I spent a few years manufacturing in Malaya and found that the supposed labor difficulties are not true. I believe that a Chinese labor force, properly handled under European management, could make most articles in competition with the rest of the world.

One of the great sources of difficulty, of course, is getting supplies of many raw materials, also spares for machinery; but with the progress being made by Malaya, this difficulty should be overcome in time.

There are many very fine natural fillers that can be mined in Malaya, one of the most interesting being a very fine whiting, which, if properly refined, is far superior to any whiting obtained elsewhere. It appears to be in a very fine colloidal state and would be ideal for latex processes.

I also note that you omitted to name two other rubber firms: The Singapore Rubber Co., or Singapore Rubber & Telegraph Co., I am not quite certain of their name, but believe one of the two titles is correct; then there is The Wilkinson Process Rubber Co.

English Manufacturer.

London, England,
September 9, 1930.

C-C-O-White

A new calcium carbonate pigment of the whiting group is C-C-O-White. Water ground, water floated, and silk bolted, it is of special fineness in texture and color and is particularly adapted to products where improvement in grain or smoothness is desired. It is not a by-product.

MIDWEST

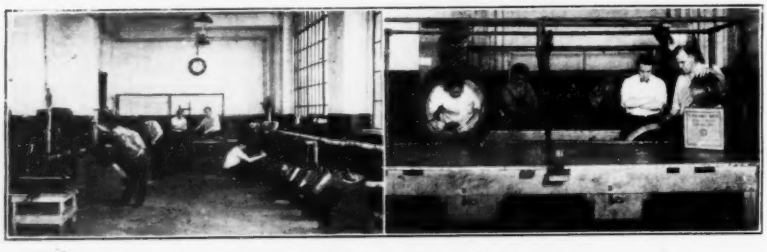
United States Rubber Co. Tire Department Activities

The opening of a tire repair school, equipped to instruct four groups of twelve students each simultaneously and offering four weeks of free instruction to all repair men in its dealer organization, was announced by the tire department of the United States Rubber Co., Detroit, Mich. This school is under the supervision of Charles Samson, manager of the Accessories and Repair Materials Division. The program of instruction covers not only every branch of service and repair work, but accounting, credit, sales, super-service, and every other phase of the tire merchant's business as it pertains to the shop. Heading the staff of instructors is Robert E. Quirk, said to have laid out the first factory repair school in the country.

The first week is spent largely in the lecture room, fitted out like a typical classroom. Copies of all lectures are supplied the student for reference. During the second week he is given scrap tires in which, supposedly, five injuries are diagrammed. These injuries are repaired and cured and are then cut down to study internal makeup and analyze for defects. The third week is devoted to both one-third and full-circle retreading and tube work, although the regular routine of tire repairs is maintained. During the fourth week the student is schooled intensively in service. Practical demonstrations in the proper method of sales approach also are a part of this week's instruction.

Two lines of white sidewall tires are being built by the United States Rubber Co., following the introduction of a white sidewall U. S. Royal, companion to the Royal Master. The Royal white sidewall tire first was made to meet equipment demands in the fine car field and is being stocked by branches and the larger dealers. The tire, the regular six-ply Royal except for the new sidewalls, is available in a wide range of the larger sizes.

M. G. O'Harra, in charge of the tire jobbing division of the United States Rubber Co., has retired after many years of service. Originally a salesman in Omaha, he advanced from one post to another, making noteworthy records at Chicago and later at Pittsburgh. He was engaged in the sale of other products of the company for a time. In 1929 he was made manager of branch tire sales.



United States Rubber Co. Tire Repair School

Baldwin Rubber Co., Pontiac, Mich., has announced plans to manufacture a molded brake lining, of which it will produce 50,000 feet daily. A new plant addition has been built with machinery being installed, for production will begin immediately on readiness. The new lining was developed by Baldwin engineers.

The Standard Oil Co. of Indiana on September 13 stated that beginning on October 15 it would start the sale and servicing of automobile tires at its gasoline stations throughout the Midwest. "We feel that we are only meeting the demand of the public for more service from the service station," the company declared.

Mulheim Rubber Co., 3328 Locust St., St. Louis, Mo., specializes in the manufacture of golf balls and also carries complete supplies for miniature golf courses.

Karg Tire & Rubber Co., 3623 Lockport St., Chicago, Ill., specializes in the preparation of steel and other metals for the attachment of rubber by vulcanization. Frank T. Karg is president.

George Washington Bicentennial

Beginning on February 22, 1932, and continuing until Thanksgiving Day of the same year, a commemoration of the two hundredth anniversary of the birth of George Washington will be observed throughout the United States. The celebration is sponsored by the Federal Government, and Congress has created a commission to formulate and put into operation plans for the event. This commission, officially known as the United States Commission for the Celebration of the Two Hundredth Anniversary of the Birth of George Washington, is composed of the following: The President of the United States, chairman; the Vice President of the United States; the Speaker of the House of Representatives; Senator Simeon D. Fess, vice chairman; Senators Arthur Capper, of Kansas, Carter Glass of Virginia, and Lee S. Overman, of North Carolina; Representatives Willis C. Hawley, of Oregon, John Q. Tilson, of Connecticut, Joseph W. Byrns, of Tennessee, and R. Walton Moore, of Virginia. There are also eight presidential commissioners: Mrs. John Dickinson Sherman, Colorado; Mrs. Anthony Wayne Cooke, Pennsylvania; Henry Ford, Michigan; George Eastman, New York; C. Bascom Slemp, Virginia; Wallace McCamant, Oregon; Albert Bushnell Hart, Massachusetts; and Bernard M. Baruch, New York. The associate directors organizing and directing the plans are Lieut. Col. U. S. Grant, 3d, and Representative Sol Bloom, of New York.

This program is intended to provide for the participation of every man, woman, and child in the United States. The celebration will extend to every village, town, and hamlet in the country. It is to be nationwide in its scope—the most far-flung and all-inclusive observance ever undertaken in America.

EASTERN AND SOUTHERN

The Brooklyn Color Works, Inc., 129-143 Cherry St., Brooklyn, N. Y., manufacture special rubber colors for toy balloons and other dipped goods, also molded bathing caps, water bottles, sponges, and sheet goods such as aprons, and proofed fabrics. The company officers are: Joseph P. Muzzio, president; Charles N. Muzzio, vice president; Baron Isaacs, treasurer.

The Roessler & Hasslacher Chemical Co., Inc., has announced that Dr. W. F. Zimmerli, who has been operating with the Commercial Development Division, New York, N. Y., has been appointed head of the Commercial Development Division, Niagara Falls, N. Y., and will make his headquarters there.

Warner Bros. Industrial Pictures, Inc., a subsidiary of Warner Bros. Pictures, Inc., 220 W. 42nd St., New York, N. Y. offers a unique means of advertising your product by talking pictures. They may be taken in your factory or in Warner studios. By special arrangement these films may be shown at leading theaters throughout the country or in an office or the home. A. P. Blumenthal is vice president and general manager, and Robert A. Winthrop is special representative. Telephone, Wisconsin 0610.

A. B. Hohmann, well known in the rubber industry of the United States and Canada as an engineer specializing in thermometry and automatic devices for controlling and recording the heat of vulcanization, is now New York representative at 146 Linden Blvd., Brooklyn, N. Y., for The Palmer Co., Cincinnati, O., manufacturer of red reading mercury thermometers.

The United States Rubber Co. recently opened a showroom in Room 811, Herald Square Building, Broadway and 36th St., New York, N. Y., where all lines of men's, boys', women's, and girls' raincoats will be shown to the trade. This office, an added new feature of the company's merchandising service, caters to buyers from all parts of the country. Norman Price Davis is selling the Raynster line; while Sam Marcus handles ladies' La Reine and men's Norwich rainwear. A cordial invitation is extended to the trade generally to call and inspect new fall raincoat models.

Pacific Mills, 24 Thomas St., New York, N. Y., on September 9 held a formal fashion showing of its new spring cottons.

Lawson S. Houghton, representative of the flooring department, United States Rubber Co., 61 Hudson St., New York, N. Y., although in his early twenties, has developed into a specialist in rubber counter and table top sales and installations. Mr. Houghton, who began with U. S. Rubber as a junior clerk four years ago, also contacts with the marine trade.

Dunlop Tire & Rubber Corp., Buffalo, N. Y., has announced the resignation, effective October 1, of John E. Maier, assistant purchasing agent, who will join Dennis & Co., Inc., stationers, also in Buffalo.

J. K. Carr, president of The B. C. Tillinghast Rubber Co., Inc., 236 Market St., Philadelphia, Pa., is celebrating his golden anniversary with that company, for he began this association on November 23, 1880, as errand boy, being promoted in turn to assistant bookkeeper, head bookkeeper, salesman, vice president and general manager, and elected president on July 21, 1921.

The Louisiana Oil Refining Co., through President M. J. Grogan, has revealed its intention to sell in its gasoline stations accessories and quick-moving parts, such as spark plugs and batteries, in addition to tires and tubes. The Louisiana company has 983 stations in six states, in addition to which it supplies products for distribution through 4,000 independently owned stations.

Bibb Mfg. Co., Columbus, Ga., following a curtailment program of several months, is now operating all of its departments on a 60-hour a week schedule.

Kelly-Springfield Suit Dismissed

Charges of a plot to manipulate Kelly-Springfield stock resulted in the dismissal last month by Vice Chancellor John J. Fallon of a receivership action brought in Jersey City against the Kelly-Springfield Tire Co., Springfield, Mass.

The suit was brought on September 5 by James A. Kelly of 194 Arlington Ave., Jersey City, owner of 100 shares of Kelly-Springfield stock. A hearing was called on September 17 by County Judge Charles M. Eagan as special master in his law office in Jersey City.

Rubber Exchange Officers

Francis R. Henderson, in relinquishing the presidency of the Rubber Exchange of New York, will devote more time to his growing crude rubber business. His name, however, will appear as a member of the board of governors for the new year.

The list of candidates to be voted upon at the election on October 21 by the membership follows:

For president, John L. Julian; vice president, William A. Overton; treasurer, J. Chester Cuppia.

Board of governors. Harold L. Bache, Robert Badenhop, William E. Bruyn, James T. Bryan, Herbert S. DeLanie, J. Frank Dunbar, Jr., Francis R. Henderson, Jerome Lewine, Hutcheson Page, Fred Pusinelli, Charles Slaughter, and Edward J. Wade.

Inspectors of election. F. D. Pressinger, R. L. Chipman, and Le Roy Wood.

Marketed First Semi-Balloon Tire

The distinction of having launched the first semi-balloon tire, "Zev", is credited to Alfred Gladstone McDonough, who, latterly as eastern division sales manager for the Mason Tire & Rubber Corp., Kent, O., made a unique record of advancing sales on a declining market. Mr. McDonough was born in Brooklyn, N. Y., on August 12, 1886, and attended primary and high schools and New York University, specializing at the latter in law and accounting. His acquaintance with rubber began with the New York Rubber Co. as assistant sales manager. Next he took up with Mitsui & Co., Ltd., in the crude rubber field, starting a department and managing it seven years, including the trying war period.

A. G. McDonough

Failures were many then among tire manufacturers, and Mr. McDonough was called upon to head many creditors' committees and to travel much to make valuations and adjust tangled finances. Next he accepted the presidency of the Federated Rubber Co. of New York, Inc., and while with that concern undertook the marketing of the "Zev" tire for the Union Rubber Co., the first year's sales exceeding a million dollars. Then, with Pittsburgh interests he put on the market the Rolls-Right balloon tire, the trade mark and patents for which he had acquired. The same interests then organized the Zev and Rolls-Right companies, Mr. McDonough becoming president of both. Finally he was induced to join the Mason concern.

Mr. McDonough belongs to Copestone Lodge, No. 641, F. & A. M., Jerusalem Chapter No. 8, and Coeur de Lion Commandery, No. 23, New York, and Squadron C, Brooklyn, N. Y. For two years he was past master of Copestone Lodge.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Aetna Rubber Co.	Pfd.	$1.75 q.	Oct. 1	Sept. 15
American Hard Rubber Co.	Pfd.	$2.00 q.	Oct. 1	Sept. 15
Baldwin Rubber Co.	Com.	$0.50 q.	Oct. 1	Sept. 10
General Tire & Rubber Co.	Pfd.	$1.50 q.	Sept. 30	Sept. 20
Goodyear Tire & Rubber Co. of Canada	Com.	$1.25 q.	Oct. 1	Sept. 15
Goodyear Tire & Rubber Co. of Canada	Pfd.	$1.75 q.	Oct. 1	Sept. 15
Goodyear Tire & Rubber Co. of Canada	Com.	$2.50 ex.	Oct. 1	Sept. 15
Goodyear Tire & Rubber Co. of California	Pfd.	$1.75 q.	Oct. 1	Sept. 20

NEW ENGLAND

Converse Rubber Co., Malden, Mass., increased its output by adopting a five-day-week schedule beginning on September 8. The total daily output now approximates 16,000 pairs of footwear besides clothing, air goods, and mechanical specialties. Robert Pletz, former western sales manager, Firestone Footwear Co., has joined the Converse company as western sales manager with headquarters in Chicago, Ill. Morton L. Paterson, formerly western sales manager, vice president, and president of the company, has retired for a well-earned rest after forty years of service in the rubber footwear field.

The Acushnet Process Co., New Bedford, Mass., manufacturer of Xtra-Wear rubber goods for the drug and the hospital trades, recently completed an extensive plant alteration and expansion program and now operates its rubber sundries division on day and night schedules. To make extra room for the finishing and packing department of this division, a whole new floor was added to one of the principal factory buildings, giving 15,000 additional feet of floor space. Employes number about 200. Already the company is busy with its 1931 bathing goods. The Achusnet president is Philip E. Young, who acts as treasurer also. Richard A. Terhune is vice president and factory manager.

The United Shoe Machinery Co., Boston, Mass., announces the election of Charles G. Bancroft, vice president, as treasurer in place of H. E. Abbey, deceased. Albert W. Todd has been elected a director.

Davidson Rubber Co., 50 Brighton St., Boston, Mass., for many years manufacturer of druggists' sundries, announces that it now also manufactures sponge rubber specialties. The company reports that fall business is showing a steady increase over previous years with the factory on a full-time schedule and some departments even working overtime.

Davol Rubber Co., Providence, R. I., on its flat goods, now made in exquisite pastel shades, has replaced its familiar circular Davol medallion with eye-catching designs in the upper half of the hot water bottle and the fountain syringe. Around each bottle has been placed a border in the same motif as the center design. The American Beauty with a medallion of roses has a border of rose leaves; while the Ace shows an airplane in graceful flight with a border of aviator's wings. A rope border appears on Old Ironsides, which bears an outline of the famous American frigate "Constitution."

J. J. McDonough, factory manager of the Plymouth Rubber Co., Canton, Mass., has recovered from a recent operation and once more is on duty.

The Narragansett Electric Lighting Co. recently completed a new sub-station for the National India Rubber Co., Bristol, R. I., consisting of a 22 kv. steel bus structure with necessary electrical equipment and some new panels attached to the existing switchboard at the plant.

Charles G. Schaedel, of Melrose, Mass., for fifty-three years in the employ of the United States Rubber Co., forty-eight of which were with the Boston Rubber Shoe Co., Malden, Mass., retired on September 1. He was employed at the Naugatuck, Conn., plant of the U. S. Rubber Co., before coming to Malden to work for the Boston Rubber Shoe Co. He was put in charge of the cutting room at the Fells factory when it opened in 1883 and remained there until 1902 when he went to take charge of the cost department at the Edgeworth plant, where he has been located ever since.

National India Rubber Co., Bristol, R. I., according to General Manager Maurice Smith, shows operating schedules and employment at the wire plant on a normal basis for this time of the year. The footwear division, closed during September, reopened on October 1. Since October is a seasonally quiet month for footwear, it is not known at what percentage of capacity the plant will operate. By December, however, it is expected that normal schedules will be reached. Three changes have been announced in the company organization: J. A. Sisson will have charge of the wire drawing and the cable departments; while W. J. McCarthy will supervise the braiding department in addition to his present duties. R. D. Asselin will control the production, planning, and scheduling department under direction of I. L. Cantwell.

A. J. Freiheit, former purchasing agent of the Hodgman Rubber Co., Framingham, Mass., has joined the L. C. Chase staff, Boston, Mass., specializing in styling and purchasing raincoat cloths. Hodgman purchasing is now handled by Robert C. Kelley, purchasing agent of the Converse Rubber Co., Malden, Mass.

Alvin C. Goetz, for many years in charge of the Boston, Mass., office of the Eagle Picher Lead Co., has been transferred to New York, N. Y., to assume charge of dry pigment sales for the company.

Nehemiah Boynton, Jr., formerly manager of Harry H. Brown Co., Boston, Mass., is vice president of the F. S. Carr Co., Framingham, Mass., in charge of sales. The company manufactures rubberized fabrics for the automobile trade and does general proofing.

W. W. Walker, formerly of the purchasing staff of the Hood Rubber Co., Watertown, Mass., and recently purchasing agent for the Angier Paper Co., Framingham, Mass., has joined the sales force of the United Paper Co., Braintree, Mass.

Hood Rubber Co., Inc., Watertown, Mass., is operating on full time with an increasing footwear ticket as the production of The B. F. Goodrich Co. is being transferred from Akron, O. The tire plant is being fitted up to make heavy footwear. Harry C. Patrick, formerly factory manager of hard rubber and heel and sole production, has assumed charge of the calender and the cutting divisions as the former production is being transferred to the Goodrich plant at Akron.

The Universal Winding Co. is to erect a new three-story brick structure to be used as an assembling building at its plant in Auburn. It will cost approximately $80,000.

Fisk Curtails Activities

The Fisk Rubber Co., Chicopee Falls, Mass., announces the resignation of F. K. Espenhain, executive vice president, which has been accepted by the board of directors. He will take a much-needed rest before revealing his plans for the future.

President H. T. Dunn will take over the former duties of Mr. Espenhain in connection with his own activities, in keeping with the company's policy of curtailment due to the recession of business.

C. M. Piper, general sales manager, also has resigned. Mr. Piper, who came to Fisk from The Goodyear Tire & Rubber Co. two years ago, has not announced his future plans. His work will be taken over by H. C. Hanson, manager of manufacturers' sales.

On September 15 the company changed from the four-day-week production schedule, which had been used for several months, to a five-day week. This will affect 1,700 employes.

Fisk, according to Vice President E. S Burke, has closed its subsidiary, Fisk Tire Fabric Co., New Bedford, Mass., for an indefinite period. This closing affects all departments, including the entire office organization. The 400 workers of the day shift also are affected. This mill had the reputation of being one of the low-cost producing units in the tire fabric field. It has 75,000 spindles and 115 heavy automatic looms with an annual producing capacity of 5,000,000 pounds of tire fabric.

New Incorporations

AMERICAN TIRE WORKS, INC., THE, (R. I.), capital stock 100 shares common no par value. Samson Nathanson, of Central Falls, Philip F. Eddy, and M. E. McCarthy.

CENTURY TIRE & RUBBER CO., Aug. 10 (O.), capital stock $1,000, all common at $100 per share. Principal office, Mansfield, O. P. H. Ober, pres.; Jesse E. LaDow, vice pres. and secy.; and Carl L. Willsey, treas. Manufacture and deal in tires and tubes.

FIRESTONE SERVICE STORES, INC., THE, (R. I.), capital stock $50,000 consisting of 500 shares of common stock at $100 each. William J. Carroll, R. M. Kimmell, and V. M. Geere, all of Woonsocket.

ROYAL ELASTIC PRODUCTS CORP., Aug. 22 (N. Y.), 250 shares common stock. Principal office, 459-61 Broadway, New York, N. Y. Lester Leonard, pres.; Samuel Rubin, vice pres.; and H. E. Cutler, secy. Manufacturer and mill representative of elastic and sanitary rubber goods.

IT IS ESTIMATED THAT A TUBING MACHINE operator will be disabled for 45 days because of fractured bones in his right foot caused by a short mandrel dropping off a table and striking him on the foot. *Rubber Section News,* National Safety Council.

NEW JERSEY

Late summer finds the rubber industry holding its own, with manufacturers optimistic over the fall trade. Because of the heavy fruit season in the West and the Midwest, certain plants received late orders for jar rings. Tire production decreased. Demand for certain mechanical goods continues well; while orders still come in for summer rubber footwear and rubber cloth. The volume of brake lining remains fairly good. Hard rubber production shows considerable improvement over last month.

Pierce-Roberts Rubber Co., Trenton, announces greater activity in all departments. A night shift was recently placed at work.

Luzerne Rubber Co., Trenton, reports improved business over last month.

Essex Rubber Co., Trenton, shows increasing business, with a greater volume in September than in August. Officials declare fall prospects very encouraging.

Frank Bernstein, president of the Puritan Rubber Co., Trenton, is spending some time in the White Mountains with his family.

William A. Howell, superintendent of Whitehead Bros. Rubber Co., Trenton, is enjoying his two-week vacation in Niagara Falls and Canada.

Pocono Rubber Cloth Co., Trenton, states that business has improved with increased orders for the fall trade.

Dr. Peter A. Fireman, president of the Lambertville Rubber Co., Lambertville, is on an extended trip abroad and will visit the principal cities of Europe.

The Murray Rubber Co., Trenton, announces that production has been decreased during the past month. The fiscal year ends on October 1 when, the concern says, the statement will show that the past year has been good in tires and tubes, despite low prices and small profits.

Goodrich Silvertown, Inc., 20-28 Passaic St., Trenton, opened its new $100,000 service station on September 6, when officials of The B. F. Goodrich Co., Akron, O., inspected the plant. An all-day program was held, and hundreds of persons were given miniature tires and other rubber novelties. Miniature tires were also dropped from an airplane. A feature was the display of a giant 58 by 14 Silvertown airplane tire, the largest used in America.

Joseph Stokes Rubber Co., Trenton, finding it necessary to place extra hands at work, now operates day and night forces. The company reports increased volume of business in all departments. The Stokes plant at Welland, Ont., Canada, is also busy again after operating on shorter hours during August.

The Thermoid Company has made a number of appointments and promotions in its sales personnel: C. A. Leas becomes district manager for the Pittsburgh territory; while Frank W. Danner is now manager for the Richmond, Va., district, and Charles S. Wright for the West Virginia district. H. H. Swain, formerly district manager for Oklahoma and Arkansas, has been promoted to supervisor of sales for North and South Dakota, Minnesota, Wisconsin, Michigan, and Illinois. His headquarters are in Chicago. The Thermoid Company is operating at normal capacity, with increased activity in the brake lining department.

Mercer Rubber Co., Trenton, is busy with orders for jar rings for the fall trade. Some of the middle and western states have a heavy fruit crop this fall, causing a demand for these rings, which is unusual at this time of the year, for jar ring orders usually come in the early summer. William H. Sayen, Jr., of Princeton, Mercer treasurer, accompanied by his family, has been on a lengthy motor trip through Canada and Maine.

J. Hauvette Michelin, vice president of the Michelin Tire Co., operated at Milltown since 1917, declared that the factory will be closed permanently. The plant shut down on May 1. Mr. Michelin stated that operations were ceased because conditions in the tire business "made it impossible to run our plant with any chance of breaking even.

"Since that time," he continued, "the stock of tires and tubes on hand has been sold, and company officials have made a study of conditions in the tire business, both in manufacturing and merchandising ends. The result of the study has brought about the decision to abandon thoughts of reopening the plant for manufacturing Michelin tires."

Raymond Rubber Co., Titusville, which closed some time ago, is razing its buildings. The company was one of the oldest rubber reclaiming concerns in the country.

United States Rubber Co., Mechanical Goods Division, Passaic, through General Manager Walter Gussenhoven has announced numerous changes in its personnel. A. D. Kunze, assistant to the general manager, heads Mr. Gussenhoven's personal staff. William C. Bowker, assistant general manager, is in charge of all manufacturing activities, with offices at Passaic, having been moved from Cleveland, O. C. W. Higbee, since February 1, 1929, assistant general manager of wire and tape sales, recently was made manager of that department, with headquarters in Bristol, R. I.

E. C. Gruehl is factory manager of the Passaic plant, and E. H. Scribner of the new roll and tank lining plant at Providence, R. I. A. J. Brown was appointed superintendent of the Cleveland plant. J. I. Taylor becomes production superintendent at Passaic, and Willard H. Cobb technical superintendent.

Herman A. Everlien heads the sales of "U. S." products, as manager of branch sales. Other sales executives are: Lewis Lebengood, manager packing sales; T. A. Bennett, manager belt construction and engineering; C. A. Russ, manager new product development; W. W. Hughes, specialties development; and J. J. Burns, chief clerk, general sales division.

Earl D. Page is manager of the control division.

The railroad and mining division has been discontinued. Matters formerly handled through this division will now go through the general sales division.

J. A. Wahlgren resigned August 1 to become general sales manager of the New York Belting & Packing Co.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Commodity	City and Country
†47,224	Tubes	Johannesburg, South Africa
†47,251	Balloons	Berlin, Germany
†47,263	Galoshes	Vienna, Austria
†47,264	Bathing caps and shoes, children's panties, bloomers, etc.	Barcelona, Spain
†47,292	Sport goods	Toronto, Canada
†47,304	Tires	Praia, Cape Verde Islands
†47,310	Druggists' sundries	Madrid, Spain
†47,407	Thread	Vienna, Austria
*47,432	Tennis balls	Irapuato, Mexico
*47,435	Sport goods	Birmingham, England
†47,446	Tires and tubes	Lyon, France
†47,447	Tires and tubes	Paris, France
*†47,479	Tires	Liverpool, England
*47,545	Bathing caps and shoes and sport goods	London, England
*47,588	Babies' pants	Santiago, Chile
†47,589	Bathing and tennis shoes	Breslau, Germany
†47,590	Surgeons' gloves, hospital sheeting, and tennis shoes	Amsterdam, Netherlands
†47,670	Ball bladders	Basel, Switzerland
†47,673	Technical and sanitary goods	Goteborg, Sweden
†47,721	Bathing caps	Alexandria, Egypt

* Purchase. †Agency. *†Purchase and agency.

This airplane of the Mexican Trading Corp., distributer of Firestone tires, is used for exclusive commercial purposes in Mexico. President Carl B. Schmidt will fly the ship to visit his dealers and stimulate sales.

PACIFIC COAST

Pacific Coast Mechanical Rubbermen's Association will hold its eleventh annual golf tournament at the Orinda Country Club, near Oakland, Calif., on Monday and Tuesday, October 6 and 7; and, according to President Irvin Reed, the affair promises to be the most enjoyable held thus far. It is likely that about thirty-five will compete for the fine trophies donated by factories and distributing concerns, and that double that number will attend the banquet on the night of the 7th. In order that the scratch players may not have an undue advantage, the handicap committee has decided to conduct the tournament in flights. The prizes will be displayed at 51 Main St., San Francisco, Calif. Officers for 1930-31 will be chosen after the games. It is the custom of the association to alternate between upper and southern California. Next year the schedule calls for the Los Angeles district. The committee in charge consists of Mr. Reed, N. S. Dodge, W. A. Corder, H. Martine, Brad. Lippincott, and C. A. Wright.

United States Rubber Co., which maintains Pacific Coast Division headquarters in San Francisco, Calif., under the direction of General Manager J. B. Brady, has transferred from that city to Los Angeles, Calif., the main office for tire distribution in the region comprising the eleven far western states. J. B. Magee, who has been in charge of the regional tire division, has moved with his staff to the company's building at San Pedro and Eighth Sts., Los Angeles. He actually returns to an old charge, as up to the middle of 1929 he had been manager of the Los Angeles branch, and had been an active executive for the company in the Southwest for over fifteen years. The company is said to have done this season the largest tire business in its history, with Los Angeles as one of its most active markets.

Firestone Tire & Rubber Co. of California is operating its Los Angeles, Calif., plant twenty-four hours a day to bring production up to current requirements; new equipment is being continually provided; and increasing use is being made of the newly added section of the works. Superintendent T. E. Pittinger, who has achieved a wide reputation for productive efficiency, has been in Akron, O., for the past few weeks conferring with executives of the parent Firestone plant about means whereby the output may be still further increased with considerable decrease in unit cost. Vice President and General Sales Manager R. C. Tucker, after nearly two months' illness, returned to his office and found, he reports, abundant evidence in the reports of distributers in the whole far west area of an extensive and abiding improvement in business.

David W. Spence, vice president and chief chemist of American Rubber Producers, Inc., a subsidiary of the Continental Rubber Co., New York, N. Y., will give an address with moving pictures on "American-Grown Rubber" at a dinner to be given at the Engineers' Club, Los Angeles, Calif., at 6 p.m., on October 3, under the joint auspices of Los Angeles Group, Rubber Division, A. C. S., and the Southern California Section, A. C. S. Dr. Spence, who has of late spent much time at his company's guayule development station at Salinas, Calif., is expected to impart some interesting information regarding improvements in guayule cultivation and extraction.

Dunlop Tire & Rubber Co. notes a very satisfactory improvement in sales and prospects throughout the far western section, according to G. R. Schumann, who, with headquarters in San Francisco, Calif., is in charge of that field. Here as in other parts of the country the company operates a chain of factory-owned stores and specializes in the distribution of tires, tubes, and Dunlop batteries. Plans are being made to open many more such stores by the end of the year. In short, the Dunlop plan is said to have proved very successful.

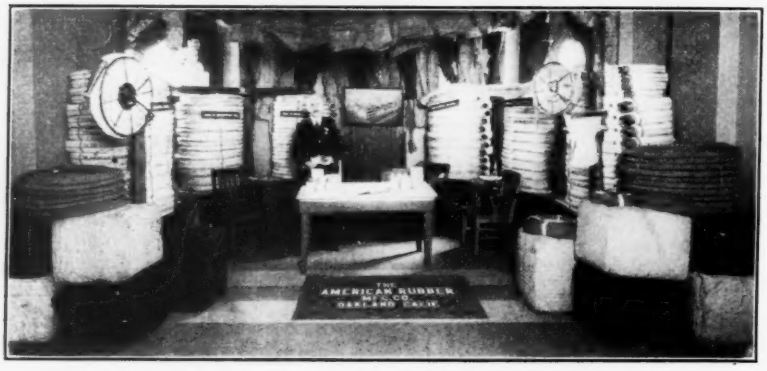
Goodyear Tire & Rubber Co. (California) is operating its entire Los Angeles factory on full time, and the tire and tube output is again said to be mounting steadily, with the sales outlook very encouraging. The staff and other workers in the Los Angeles plant shared in the salary readjustment ordered by the parent Goodyear company at Akron, O., but it is believed that the setback will not last long. All the factory executives as well as the managers of all the company's sales branches in the eleven states served by the Los Angeles works, left early in September to attend the annual conference at the Akron plant.

Pacific Coast Rubber Co., 51 Main St., San Francisco, Calif., one of the largest dealers on the Coast in belting, hose, and packing, according to President and Manager Irvin Reed, observes a decided improvement in the tone of trade. The company is holding its own and preparing for much livelier retail business in the near future, says Mr. Reed.

Samson Tire & Rubber Co., Los Angeles, Calif., continues to be crowded with orders, and the big new plant is being worked well up to capacity to execute them. While no extensive changes have been made lately in the plant, a steady improvement occurred in the general equipment with much enhancement in productive efficiency. President A. Schleicher spent much time last month on a business trip which included New York City and other important eastern trade centers.

Los Angeles Rubber & Asbestos Works, according to President W. Art. Corder, has bought the Black & Penn Machinery Co., which has long conducted a general machinery business with a well-equipped factory at Sixth and K Sts., San Diego, Calif., and has changed its name to San Diego Machinery & Supply Co. The Los Angeles company there will manufacture many types of rubber belting and mechanical goods, of which it has long been one of the largest distributers in the Southwest.

Franz Foundry & Machine Co., Akron, O., which operates a branch factory at 760 E. 60th St., Los Angeles, Calif., is working at the latter place on a new type of a full-circle tire retreader, which it expects to put on the market in about a month and which, it is said, will save much time and labor. Business has been holding up very well, despite the general let-down in the trade, and Manager Wm. Franz reports prospects as quite encouraging. President C. W. Franz, whose home is in Pasadena, Calif., is visiting Akron.



PACIFIC COAST FIRE CHIEFS' CONVENTION

The annual convention of the Pacific Coast Association of Fire Chiefs was held at Oakland, Calif., September 1-4 inclusive. A large number of fire chiefs attended and enjoyed the informative talks and discussions on fire prevention. The booth of the American Rubber Manufacturing Co., Oakland, Calif., shown in the accompanying illustration, exhibited 3,000 feet of 2½-inch and 1½-inch double-jacketed, cotton, rubber-lined fire hose in the various brands made by the company.

Xylos Rubber Co., 2525 Firestone Blvd., Los Angeles, Calif., a Firestone subsidiary, which has one of the most up-to-date reclaiming plants in the country, continues to manufacture many special types to order in addition to standard grades; and, according to General Manager H. G. Allen, has kept average total output well up to 1,000,000 pounds a month, despite none too favorable conditions in the crude rubber market for reclaimers.

California Rubber Products Co., 621 E. 9th St., Los Angeles, Calif., manufacturer of a very complete line of rubber garments, including hospital, household, and laboratory supplies, is introducing a novelty: brightly colored and figured aprons for chemical classes in schools and colleges, which is said to be meeting with much success. Business in general is reported as very good. Manager C. M. Smith has gone to Chicago, Ill., to arrange for opening a branch to supply midwestern and eastern trade.

W. K. Kelly, 150 S. Brand Blvd., Glendale, Calif., is manufacturing a rubber "Tru-Put-Tee-Pad" for miniature golf courses, which he recently patented.

Huntington Rubber Co., 1132 N. Vermont Ave., Los Angeles, Calif., conducted by H. H. Huntington, a pioneer in the rubber goods business in the Southwest, has lately added much machinery to its plant, which is devoted largely to wholesale tire retreading.

W. C. Hendrie, of **W.** C. Hendrie & Co., 405 Towne Ave., Los Angeles, Calif., sole representative of the Republic Rubber Co., Youngstown, O., reports business as steadily improving, with the outlook considered excellent.

Pacific Goodrich Rubber Co., Los Angeles, Calif., reports production well up to normal and that its branch managers in the eleven far western states find prospects steadily improving. A recent visitor from the parent Goodrich concern in Akron, O., was Vice President T. G. Graham, who is in general charge of sales. W. R. Hucks, chief compounder, has been away for a few weeks' conference with production heads in Akron.

United States Rubber Co., and **Samson Tire & Rubber Co.,** Los Angeles, Calif., are reported to be negotiating a merger of tire interests. This is logical as the United States company has no manufacturing facilities on the Pacific Coast.

Rubber-Covered Dorr Equipment

The Dorr Co., 247 Park Ave., New York, N. Y., manufacturer of industrial equipment, has acquired from The B. F. Goodrich Co., Akron, O., licenses for the use of its Thermoprene process. A plant for the application of rubber to steel, iron, and other metal parts under the Thermoprene process patents has been added to the manufacturing establishment of the Dorr Co., and has already successfully applied more than 5,000 square feet of rubber to thickeners, agitators, rod mills, ball mills, pumps, filters, and similar industrial equipment.

Long in West Coast Trade

Twenty-eight years with the same concern, twenty-four having been spent in selling its products in the far west area, is the unusual record held by J. B. Lippincott, now head of the sales organization bearing his name and Pacific Coast representative of Boston Woven Hose & Rubber Co.,

J. B. Lippincott

Boston, Mass.. the main Pacific Coast branch of which is at 461 Market St., San Francisco, Calif.

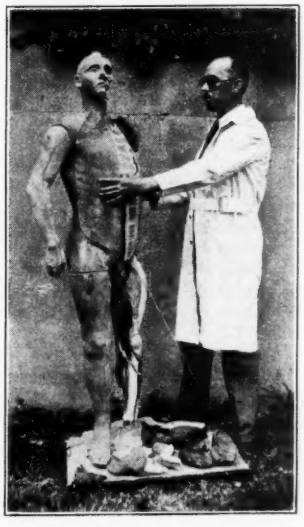
One of the best-known men in the rubber line in his extensive field, Mr. Lippincott is still as energetic a business getter as he was when pioneering a quarter of a century ago and keeps in close personal contact with his steadily widening circle of social and commercial acquaintances. One evidence of his popularity in the trade is the fact that he has, since it was organized several years ago, been retained as an officer in various capacities of the Pacific Coast Mechanical Rubber Men's Golf Association.

Mr. Lippincott was born in Long Branch, N. J., and after leaving high school attended and graduated from Drexel Institute, Philadelphia, Pa. The Peerless Rubber Co. gave him his first experience in the handling of rubber goods, and after a year with that concern he cast his lot in 1902 with the Boston Woven Hose & Rubber Co., with which he has been associated ever since. He began as assistant manager of the Philadelphia office and displayed such skill in merchandising that the company in 1906 put him in Los Angeles, Calif., to develop what promised to be and has since proved a very profitable field. To handle better the territory he organized a sales company which soon expanded to cover the entire Coast.

As a Shriner Mr. Lippincott has figured prominently in the more important affairs of the order for many years on the Coast and he is also a member of the Olympic Club of San Francisco. His chief hobby, or dissipation as he puts it, is golf, and that he is a player of no ordinary ability is well attested by the numerous trophies of rubber men's and other tournaments adorning his office.

Male Anatomical Model Entirely of Rubber

Rubber has been found most satisfactory in reproducing an exact replica of every bone and muscle and each organ of the



Dr. Clark and His Anatomical Model

human body of a male. This work was done by Dr. Loyal Clark, of Portland, Ore., after five years of research at the University of Oregon Medical School. This life-size model, here illustrated, has been declared most complete by internationally known physicians and surgeons. It is the only one made of rubber, an original idea of Dr. Clark.

The Huntington Rubber Mills, Portland, developed the rubber of various colorings and textures used in the model. Since bones are hard and have a color of their own, it was necessary to produce a hard, non-stretching rubber of the color and the texture of bone. For muscles a soft, elastic rubber of proper color, yet a bendable, but non-stretching rubber, had to be devised.

All colors known to the arts are found in the human body; yet the process developed after several years' experimenting are nearly perfect as humanly possible.

This model will replace human bodies in use for teaching purposes in medical schools, dental colleges, and similar institutions.

Dr. Clark also developed an all-rubber obstetrical life-size model[1] made at the University of Oregon Medical School in 1925. It now is being used in the leading medical centers of the United States and abroad. Two of the models are in Washington, D. C., being used by the government in instruction in the hospital bureau of standards.

[1] India Rubber World, Mar. 1, 1928, p. 70.

CANADA

It was reported in these columns that rubber manufacturers might adjust their discounts off lists for mechanical rubber goods to include the sales tax reductions of 2 per cent, not being deducted from the face of invoices. But as yet no action has been taken, and the system of deduction from invoice face values still continues.

Rubber goods manufacturers state that very shortly they will announce 1931 booking prices for garden hose. It is not known yet whether any change will occur from prices quoted this season, but the announcement is awaited with keen interest by the trade. The heavy buying season is over in garden hose for this year. Prices remained steady throughout and at present are the same as when the season opened.

The present price of crude rubber reached a new low level. The effect of this will not be felt immediately, but later in the year, when the rubber being bought now is put into production of tires and mechanical rubber goods, some influence may be seen in prices.

The factories are now shipping fall orders in rubber footwear. While it will be some weeks before the goods will be very urgently required in retail stores, an early start must be made so that the entire trade will have supplies in plenty of time. Some retailers, we are told, take advantage of the extra discount for early shipment.

Samples of canvas outing shoes and rubber footwear in staple and novelty lines in smart color designs with more than eye appeal, for next season are about ready and soon will be shown to the retail trade. We are given to understand that some rubber manufacturers plan to simplify the number of lines carried. Duplication of crepe and compounded rubber sole lines has been discontinued by some companies because of the tendency of the trade to demand the cheaper class of shoes, particularly for children.

Automobile production during 1929 reached a new high level of $177,315,593, being $162,867,495 in 1928 and in 1927, $128,700,514. These totals include the factory value of the cars and parts and also the amounts received for custom work and repairs made at the factory. The number of cars produced in the twelve Canadian factories amounted to 262,625.

Miner Rubber Co., Ltd., Montreal, P. Q. On a recent Saturday a large party of office employes, foremen, superintendents, and others, along with their families, gathered at the summer cottage of Mr. and Mrs. W. H. Miner, situated on Lake Bonnallee, thirty miles from Granby, P. Q. This picnic is always looked forward to as one of the events of the season by Miner employes. An extensive athletic program was held. The presentation of illuminated certificates, gold watches, and substantial checks to employes who had completed twenty years of service with the company, numbered fourteen, including two factory superintendents and two Montreal branch salesmen.

Viceroy Mfg. Co., Ltd., Toronto, Ont., is the new name of Canadian I. T. S. Rubber Co., Ltd.

Canada Goodrich, Ltd., held a sales conference in Montreal last month when A. J. Minister, footwear sales manager at Kitchener, Ont., announced a new line of canvas and rubber footwear in sun-tan and brown and white patterns. R. C. Groffmann, advertising manager of the head office at Kitchener, outlined the new merchandising program, and R. A. Gunther, Montreal district manager, reviewed the previous styles and models, stating that the coming year would be a most successful one. Representatives were present from Ottawa, Ont., the Quebec and the Maritime Provinces.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., soon will announce its plan of booking garden hose for 1930 and promises then something entirely new. The two products, Imperial and Flexicord garden hose, are claimed by the company to be the only Canadian made hose made by the lead encased mold curing process.

Harry H. Lewis has been appointed Dunlop sales manager for Western Canada, it was announced by E. C. Martin, general sales manager of the company. Mr. Lewis, formerly branch manager of the Calgary, Alta., office for the past eighteen months, prior to which he was manager at Saskatoon, Sask., and Victoria, B. C., has covered most of the western territory during his twelve years' association with the company.

Firestone Tire & Rubber Co.'s giant silver Ford tri-motor plane, "Firestone," was an added attraction at the air pageant held last month at St. Hubert Airport under the auspices of the Montreal Light Aeroplane Club. The plane arrived in Montreal from Quebec bringing fifteen passengers, officials of the company and Quebec City distributers of Firestone tires. Among those who made this trip were E. W. BeSaw, president of the Canadian Firestone Co., with headquarters at Hamilton, Ont.; J. A. Livingston, trade sales manager; Russell T. Kelly, advertising counsel; and L. G. Bowker, of the Automotive Equipment Co., Montreal.

Dominion Rubber Co., Ltd., Montreal, P. Q., recently closed down permanently its Elmira, Ont., factory, it being the policy of the company wherever possible to close down smaller units and transfer production to larger ones. It is reported that the shutdown will affect about 80 Elmira families. All old employes have been placed in the Merchants Rubber Factory, Kitchener, Ont., another Dominion subsidiary.

J. T. Archibald now covers the city of Hamilton and Niagara Peninsula for the Dominion company, Toronto, Ont., branch. He has had many years' experience in the rubber footwear business and is exceptionally well known among the retail trade of his district.

James Brown, branch manager of the Independent Rubber Co., Ltd., Quebec, P. Q., declared that J. Eloi Tremblay, showing the colors of "Les Zouaves de Quebec," and winner of the Amateur Championship for the Quebec district in the annual ten-mile race, wore Speed King shoes.

C. H. Carlisle, president and general manager, Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., recently contributed a specially written article for the Toronto Year Book, in which it was shown that the Canadian rubber industry has grown in sales volume from $43,000,000 in 1921 to more than $83,000,000 in 1928, is in eighth position in the Dominion's list of enterprises, and looms as a leading factor in Canadian prosperity and its business structure.

The Goodyear Trophy, donated by the Goodyear company for competition among the members of the Model Aircraft League of Canada, at the recent annual contests at Ottawa, Ont., was awarded to Walter Allder, 17, of Vancouver, B. C., who created a world record in the Senior Outdoor Flying Stick Type Model Event. Time, 18 minutes 49 1/5 seconds.

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I. R. I. Essay on Costing; Prize Competition Open to All

Sir George Beharrell's prize of five pounds will be awarded for the year 1930 for that essay dealing with "Methods of Costing in the Rubber Manufacturing Industry," which in the opinion of the Council of the Institution of the Rubber Industry is considered the best and which is submitted by a member of the rubber industry, not necessarily of British nationality or a member of the Institution of the Rubber Industry.

There is no restriction as to age or position in the industry.

The length of the essay should not exceed 5,000 words and must be accompanied by a brief summary not exceeding 200 words.

The essay should be of such a nature that it will stimulate interest not only among cost accountants, but also among those connected with the sales, production, and technical aspects of the rubber manufacturing industry.

The essay must be submitted under a *nom de plume*, the actual name and address of the author being enclosed in a sealed envelope addressed to the Secretary of the Institution of the Rubber Industry. The identity of each author will be treated as strictly private and confidential until the award has been decided.

No essay in connection with the 1930 award of the prize will be considered unless it reaches the offices of the Institution of the Rubber Industry, Faraday House, 10, Charing Cross Road, London, W. C., not later than December 31, 1930. Essays sent from overseas may, however, be received up to January 21, 1931.

The Institution has the right to publish any of the essays submitted. Presentation of the award will be made at the annual general meeting of the Institution.

The final selection of the winner will be in the hands of the Council of the Institution of the Rubber Industry. The Council shall have power to modify these conditions if circumstances render such a step desirable.

The Rubber Industry in Europe

GREAT BRITAIN

Estate Outputs Increase

If figures can be produced to show that the low price is forcing native producers in the Dutch colonies to slow down in the matter of tapping, the very reverse can be proved for the European estates. A well-known Stock Exchange firm of rubber share brokers points out that the July outputs reported by British companies show an increase of more than 10 per cent as compared to the total for the corresponding month of the preceding year, and deduces from this that in the first place estates have benefited from the productive point of view from the May tapping holiday and, still more important, that the policy of the industry is still to produce maximum crops, despite the loss that is being incurred.

This is also demonstrated by the analysis of crop returns published by the *India Rubber Journal*, which shows that the crops of 419 rubber companies totaled 40,344,349 pounds during July, 1930, against 35,698,060 pounds in July, 1929, and 36,482,142 pounds in June, 1930. The Malayan returns show an increase of 8.92 per cent as compared to the corresponding month of last year, Java an increase of 26.85 per cent, Sumatra 3.91 per cent, Ceylon 21.70 per cent, India and Burma 99.17 per cent, and Borneo and Sarawak 10.11 per cent.

Dutch Cooperation in Restriction Denied

After months of effort to unite British and Dutch producers in a scheme to save the rubber planting industry, the Liaison Committee suddenly finds that its work has all been in vain. The Dutch East Indian Governor has informed the Governor of Malaya that owing to the well-known difficulties which would obstruct efforts to involve the natives in the Dutch colonies in a scheme of restriction, his government could not see its way to cooperating in such a scheme. In a letter he informed British planters that the Dutch Government would not support any restriction scheme and that economic laws would be allowed to take their course.

It cannot be said that this outcome was unexpected, for from the beginning it was known that the Dutch Government was reluctant to interfere and that cooperation of the Malayan Government depended upon the action of the former. Nevertheless, hope existed that in view of the seriousness of the situation the Dutch Government might change its attitude and that eventually a restrictive scheme would be enforced. Many think that it would have been better for the industry if it had abandoned all hopes for restriction months ago, for it is claimed many concerns have simply been hanging on waiting for some artificial means of rescue and in the meantime have produced to the limit in a desperate effort to cut costs and benefit from any improvement in price that might take place. These concerns, it is believed, will now be forced out of production, and in this way the present situation of over-production may be somewhat alleviated.

That the survival of the fittest theory will have such a smooth run is doubted by others. Thus the *Financial Times* says:

"That the supporters of restriction, especially directors of the smaller and more expensive estates, to which it affords the only hope of survival, will give in without a struggle is unlikely. Various protests have already been made. The Ceylon Rubber Restriction Committee refuses to accept the decision as final and has resolved to urge on other producing countries the desirability of some form of government control. That its example will be widely followed may be anticipated, but until the Dutch authorities are willing to cooperate, the position remains as set out in the Singapore government's letter. Meanwhile the price of the commodity has recovered substantially from the exceptionally low level of 3¾ pence per pound touched on the morrow of the announcement, and though the immediate outlook is far from bright, the situation is not without its encouraging features."

Dutch Opinion

According to a communication from Amsterdam to the *Financial Times* the report that the government of the Straits Settlements has decided not to intervene in the present rubber crisis made an unfavorable impression. All schemes of restriction or valorization will have to be abandoned and survival of the fittest is to be the only remedy. All hope is now centered on the possibility that the present low price will cause a natural restriction of rubber, even on the part of the native planter. It is now believed that the low price of rubber will result in the native producer turning to other products for a means of subsistence, and to substantiate this opinion it is pointed out that July export figures from one or two Sumatra districts show considerable decreases.

Shoe and Leather Fair

The International Shoe and Leather Fair will be held at the Agricultural Hall, Islington, from October 6 to 10, inclusive, and rubber footwear and accessories are to be fully represented. Among the novelties to be seen are the Devart automatic heelless rubber gaiter with concealed quick fastener down the front, and a new material known as Laflex for insoles, middle soles, heel lifts, and stiffeners, products of the Dominion Rubber Co., Ltd., London. J. G. Franklin & Sons, Ltd., Dalston, will exhibit bathing shoes in which the uppers have flower designs, embossings of crocodile pattern or lattice work, all in a variety of colors and decorations to match bathing costumes, while the soles are of crepe combined with thickened rubber special duty soles molded in various patterns as a protection on pebbly beaches.

Gutta-Percha & Rubber Co. will have on view its "Speed Rainette," an all-rubber galosh with turn-up cuff, and "Janette," an overshoe of wool jersey trimmed with Belgian coney fur. The Hood Rubber Co. will feature its white-fleece-lined gaiter boot and the Rainpruf Wellington with waterproof extension on top designed to give extra protection from rain and sleet and to exclude water dripping in from wet coats.

Etablissements Hutchinson will show its well-known specialties and Wellingtons, the latter including an exceedingly graceful model with moire leg. Ladies' fancy brocade and velvet slippers with high heels, men's leather slippers, and children's sandals and play shoes with Duride soles will be displayed by the Palatine Branch of the Leyland & Birmingham Rubber Co., Ltd. A complete display of heels, soles, and tips, including the new Duragrip soles and heels for golfers, will be sent by Phillips' Patents, Ltd.; while Redfern's Rubber Works, Ltd., will have on view its latest "Tufhide" sole, style 306, designed to be nailed onto the shoe but can also be gummed on.

British Notes

The Dunlop Rubber Co., Ltd., announces the sale of the Macintosh Cable Co.'s works at Derby. When the Dunlop company in 1926 took over the Macintosh group of rubber manufacturing companies with which Lord Colwyn was associated, it acquired as a part of the general deal an interest in the Macintosh Cable Co. The business of this company proved quite a satisfactory one, but it embraced both electric cable manufacture and electrical constructional engineering, branches of activity which under modern developments are becoming increasingly removed from the normal scope of a rubber manufacturer. For this reason the Dunlop company has disposed of its interest in the cable company on favorable terms. As a result premises will be released which are required for the expanding business of the Dunlop Rubber Co. According to the original report of this sale, the British Insulated Cables, Ltd., is the buyer.

The Goodyear Tire & Rubber Co. factory at Wolverhampton will be enlarged by the addition of a new two-story and basement building, adding 33,600 square feet of space to the factory.

The Avon India Rubber Co., Ltd., Bradford-on-Avon, has arranged with the

Seiberling Co., Akron, O., U. S. A., to manufacture the Seiberling giant tires in Melksham. This will not involve any change in the management of the Avon company. At first, there was talk of establishing a Seiberling factory in England, but instead the American company has arranged with the Avon company to manufacture the new tires according to Seiberling specifications.

GERMANY

The 1929 Rubber Industry

Considering the total results of the German rubber industry during 1929, it is interesting to note how this branch of industry overcame the period of depression. Gustav Plum, in a recent issue of the *Gummi-Zeitung*, analyzed the position of eighteen rubber factories from available data.

The individual firms do not publish exact figures regarding their volume of business, but rather indicate the general tendency. Thus, the Harburger Gummiwaren-Fabrik Phoenix A.G. states that it was able to increase the turnover to a certain extent; the Veritas Gummiwerke A.G., formerly Vereinigte Berlin-Frankfurter Gummiwaren-Fabriken, speaks of increased production; the Continental Gummiwerke A.G. mentions increased turnover for the year; the Mannheimer Gummi-Guttapercha-und-Asbest Fabrik A.G. is more explicit and records an increase in business of about 20 per cent.

Some important changes have been made in the shares of capital stock: the Continental Gummiwerke A.G. mergers necessitated increasing the capital, but the Asbest-und Gummiwerke Alfred Calmon A.G., on the other hand, is planning to reduce its capital from 4,090,000 to 2,450,000 marks. A fairly general increase in reserves is noted, the Veritas company in particular having nearly doubled the amount as compared with 1928 figures.

With reference to the use of foreign capital by German firms, it is pointed out that the long term obligations of the Veritas, Continental, and Phoenix companies have been increased. On the whole the amount of owned capital as compared with the total capital invested in most of the firms has decreased.

The difficulty of making collections is revealed by the fact that practically all the firms report larger sums outstanding.

Profits were adversely affected not only by the decreased prices for finished goods but also by the considerable rise in wages and, in many cases, unduly heavy taxation. Measures for rationalization have been fairly generally undertaken to offset this. The net profits obtained by the different members of the group in some instances showed a distinct upward tendency, but in others again an equally sharp decline was recorded. Yet dividends have been increased, and in a few cases firms that had stopped dividends for a year and more resumed their distribution.

However, says the writer, this is not to be regarded as a sign of unusually favorable conditions; the fact of the matter appears to be that in the period 1924 to 1927 and also during part of 1928 the industry was forced to use its reserves and thereupon had to take steps to strengthen the financial position. Where larger distributions have now been made, this was probably done with an eye to the claims of the shareholders, part of whom have had to do without a return on their investments for a long time.

Prospects for the current year are variously judged: Veritas Gummiwerke reports increasing sales and is optimistic; on the other hand, Veithwerke A.G. can see no change, its volume of business having remained stationary; and the Phoenix concern finds that the first months of the present year bear the characteristic earmarks of the weak economic situation.

Interesting New Patents

In manufacturing floor coverings of rubber it is difficult to obtain a uniformly even and smooth surface. The Continental Gummiwerke A.G., Hannover, has now patented a process which, it is claimed, solves this difficulty. According to the new process, double the quantity of rubber required for the finished floor covering is applied to a jute base, and a jute top is put over the rubber. The whole is then pressed together in a calender and vulcanized. After vulcanization the covering built up in this manner is split through the center by an ordinary ribbon saw splitting machine, and in this way two lengths of floor covering are obtained, each with a jute backing and a smooth and even surface.

Three new types of hose have just been patented. The first, a flexible metal hose spirally formed, is so constructed that the overlapping edges not only interlock, forming a channel closed on all sides to take up the usual cord packing but at the same time form a second channel, open on the outside, to receive another packing of asbestos or rubber cord. The second cord protrudes somewhat over the metal edge so that when the outer rubber cover is forced over it, the packing is firmly pressed into position, and a perfectly tight joint all around is achieved. The rubber cover may be braided for added protection. It is claimed that by this simple means a metal hose for high and highest pressures is obtained, which in addition retains its easy flexibility permanently. The patentee is the Metallschlauch Fabrik Pforzheim vorm. Hch. Witzemann G. m. b. H., Pforzheim.

The Bremer Gummiwerke Roland A. G., Bremen, has designed a hose for use in autogenic welding, in which woven and braided covers of asbestos thread are employed. Unprotected hose for the purpose frequently catch fire from flying sparks and darting flames, causing explosions, and the asbestos covering is intended to prevent this danger.

Wild silks and Tussah silk are to be used for making either plain or rubberized hose, according to a patent obtained by Vollrath & Sohn Komm. Ges., Bad Blankenburg. The silk thread is to be used instead of the customary hemp, cotton, ramie, and artificial silk thread, and may also be used in combination with the latter type of thread. In addition the wild silks are to be utilized as braided insertions or for covering high pressure rubber hose.

BELGIUM

The rapid development of Belgium's rubber industry during the last few years seems to have escaped attention and it must be a surprise to many to learn that whereas in 1925 Belgian imports of rubber goods exceeded exports by 120,000,000 francs, in 1929 the exports actually exceeded the imports by no less than 168,000,000 francs. This is all the more surprising when it is considered that at the same time the imports have also been steadily increasing. Figures for the three years 1927, 1928, and 1929, show that imports were 43,281, 48,205, and 57,445 quintals respectively. During the same period the exports were 51,736, 75,647, and 89,562 quintals respectively; that is to say, in the three years there was a gain in imports amounting to about 35 per cent, and a gain in exports of about 42 per cent.

Tires and other automobile accessories form the chief export and import articles. In 1929 imports of these goods were 30,644 quintals against 26,053 quintals in 1928; while exports were 78,627 quintals against 62,434 quintals. The other items included footwear, of which the imports rose from 1,789 quintals in 1928 to 3,888 quintals in 1929; while the exports fell from 2,524 quintals to 1,729 quintals. Over two-thirds of the footwear imports came from Germany. The total imports of technical goods amounted to 7,658 quintals in 1929 against 6,689 quintals in 1928; the exports are considerably less and were 3,575 quintals in 1929 instead of 3,694.

The Belgian exports of insulated wires and cables deserve special attention; these were 24,336 quintals in 1928 and 29,070 quintals in 1929 and amounted to about eight times the imports of these articles. England, China, Holland, Sweden, and Egypt, in the order named, are the chief customers for Belgian wires and cables; while Germany supplies most of the imports of these goods.

SWEDEN

Available figures for the first half of 1930 show a decline in Sweden's rubber industry, which is particularly marked in the imports of crude rubber and the exports. Crude rubber arrivals fell from 2,026 tons to 1,294 tons; while the exports declined from a total of 390 to 185 tons. The exports included hard rubber, in blocks and sheets, 10 tons against 22 tons; other rubber sheets, packing, etc., 26 tons instead of 73 tons; and rubber footwear, 149 instead of 296 tons.

Of imports, covers for automobile and motorcycle tires showed an increase, the respective figures for 1929 and 1930 having been 847 tons and 1,183 tons; tubes for automobiles and cycles fell slightly from 96 to 92 tons; belting was 177 instead of 164 tons; bicycle accessories not elsewhere mentioned, 282 instead of 374 tons; rubber heels and soles came to 172 tons.

The Rubber Industry in the Far East

MALAYA

Restriction Rejected

The rubber industry at last knows where it stands. After many months of suspense the planters now know the worst: the government will not enforce restriction and the law of the survival of the fittest is to rule.

Sir Cecil Clementi, Governor of the Straits Settlements, issued a statement in the form of a letter concerning his visit to Java where he conferred with the Governor-General of the Netherlands East Indies on the question of rubber. In giving his reasons for rejecting restriction schemes the latter stated that while improvement of price was important to European plantations, it was, as far as the natives were concerned, desirable only from a general economic point of view. In the native gardens little tapping was being done at present; but if restriction was successfully carried out by the Europeans so that the price was raised to a level reasonably profitable to the natives, a considerable increase in native output would follow and counteract the restriction measures, if not nullify them.

The Governor-General also told Sir Cecil Clementi that voluntary cooperation from the native was not to be expected. In the first place it is against Dutch policy to force restriction upon the natives. Then, the owners of small holdings depend to a large extent on rubber for their living and would be seriously hurt by restriction; and again, restriction of native output is made most difficult as there is no land registration in the Dutch colonies. Apart from this, restricting of exports would result in the accumulation of large stocks, and though an excessive export duty might have the desired result, small owners would be hard hit. Cessation of tapping a few days weekly, even if native cooperation were secured, would not be very successful, for the increase in output on tapping days would outweigh the decrease when there was no tapping.

Finally it was feared that consumer countries might make reprisals by increasing import duties on Dutch East Indian products. So that intervention by the Dutch authorities could not be expected.

"The rubber industry," concludes the Governor's letter, " . . . . suffers from the fact that it has never yet had a normal period.

"The years before the war—1905 to 1914—when the industry was being established, were essentially abnormal. The extraordinary expansion in demand gave a scarcity value, and the industry had not found its level when the war broke out and produced a world-wide abnormality in trade conditions.

"When peace came, it found production hopelessly outdistanced by the abnormally restricted demand of a world striving to reorganize its shattered trade relations. The remedy of restriction applied in 1921 once more produced wholly abnormal conditions, and when it was removed, the world's production was again found vastly to exceed the world's consumption.

"What is now needed is that rubber prices should be stabilized by the action of economic laws, and the Governor, as advised by the Executive Council, considers that unilateral action in this peninsula would be worse than useless. The Governor, therefore, decided that economic laws must be allowed to take their course in the hope that thereby the stabilization of rubber prices will be realized.

"When this has been achieved, a large increase in the world's rubber consumption may confidently be expected, and the industry would enter at last upon a normal period, in which supply and demand would approximately balance."

Coolies' Wages Reduced

The F. M. S. Government announces that the Indian Immigration Committee with the approval of the Chief Secretary has prescribed that from October 5 the standard daily rates of wages payable to all able bodied Indians shall be as follows: Districts of Lipis, Raub, Bentong, Temerloh, State of Pahang: Male laborer above 16 years, 47 cents; female above 15 years, 37 cents.

Districts of Klang, Kuala Selangor, Kuala Langat in the State of Selangor: Male laborer above 16 years, 40 cents; female above 15 years, 32 cents; a child above 10 and not above 15 or 16, 16 cents.

A comparison with previous rates shows that the new rates provide for very considerable reductions. In Pahang the notification of May 21, 1927, provided that the rates should be 58 cents per day for a male laborer and 46 cents for a female. In Selangor a notification issued on November 23, 1928, established the rates at 50 cents for a male laborer, 40 cents for a female, and 20 cents for a child.

Survival of the Fittest

It has been suggested that if the rubber industry is left to find its way out of the slump, it would pass over to the natives. To support this opinion it has been argued that while the native has no overhead, even a moderate-sized European estate has large expenditures to meet, which are frequently excessive. What these may be can be gathered from details of a scheme submitted by two local planters, Were and Stanton, for dealing with the present overproduction of rubber.

This scheme suggested the temporary shutting down of a sufficient number of estates to bring about a reduction of 200,000 tons in the world yearly output. The estates stopping tapping would receive a maintenance grant of 8 cents (Straits currency) per pound from funds raised by a government cess on the production of the other estates, the grant to be used for the upkeep of the estate and to pay the customary agency, head office, and directors' fees.

It is considered that a labor force of one coolie for every 10 acres and an adequate European staff would be required; and the costs for an average estate of 1,000 acres under these conditions, with labor at 40 and 30 cents per day and the salaries of European staff slightly reduced would work out at $32 per acre per annum, the expenditures being itemized as follows:

Salaries at $500 per month	$6,000
Allowance	250
Provident fund at $25 per month	300
Leave pay, two months per annum	1,000
Passage, one-quarter	300
Visiting, two visits at $250	500
Insurance	200
Postage, etc.	250
Telephone	300
Quit rent	3,500
Sundries and transport	100
One watchman, one line sweeper	300
Tools	150
Repairs to bungalow and lines	500
Medical and hospital	1,000
Coolie assessment, 50 cents per quarter	200
Gardener	150
Upkeep, one coolie to 10 acres	10,000
Secretaries, agency, directors	7,000
Total	$32,000

This expenditure, it should be borne in mind, is merely for keeping the estate in fit condition and does not include tapping costs, manufacturing or other charges though, of course, fees to directors and others go on as usual.

Incidentally the account helps to explain why producers have continued to exploit their estates in the face of exceedingly low prices, for these minimum costs have to be paid whether the estate is producing or not; and so long as estates find that they lose less when tapping than when closing down, they will continue to tap.

Native planters in the Dutch East Indies have no such considerations to prevent them from closing down if they see fit to do so; hence we find the output from estates increasing while that of the Dutch East Indian native is decreasing.

Optimistic Views

But many scoff at the idea of the natives capturing the rubber industry and they point to the decreasing costs on estates and the new methods of planting by which these will be still further reduced. And it is a noteworthy fact that the number of estates able to produce at 6 pence and 7 pence per pound has been increasing of late. Apart from this and the effects on costs to be expected from budded rubber in the future, it is worth considering that the very burden of overhead that estates

now carry suggests the remedy: such reorganization as will reduce the overhead to the irreducible minimum. That and improved methods of planting should enable the better estates to hold their own against the native planter.

It may here be added that the Dunlop Rubber Co., which owns nearly 70,000 acres of planted rubber land, recently sent both to its shareholders and those of the Dunlop Plantations company an optimistically worded review of the existing situation.

Regarding the native menace the Dunlop company says that as far as price is concerned, the European planter starts with some initial advantage, for Dutch native rubber is worth in the East about 3½ pence per pound below London price, while European plantation is worth f. o. b. Singapore about 1 pence below the London price.

Then it is stated that the critical price, as far as native competition is concerned, is about 8½ pence per pound. Above this price the natives are encouraged to increase both tapping and further planting; below this price, Asiatic tapping is less, and eventually new planting is also discouraged. So that it is stated, the whole question boils down to this: Can the European owner sell at a profit while the price of rubber is below the datum line of 8½ pence per pound in London and so meet in active competition the Asiatic production?

As far as it is concerned, the company, which by the way has consistently opposed restriction, states that last year its costs were 5½ pence per pound, f. o. b. Singapore, the figure including all charges of every description incurred in Malaya, but not depreciation. For the current year the average is put at 4½ pence per pound, the cost during August having actually been under 4 pence per pound. When the new and the improved areas come into tapping, the costs are expected to decrease to under 3 pence per pound. With such costs, says the firm, it can view the present situation without a great deal of alarm.

NETHERLANDS EAST INDIES

Hevea Marcots

Although experiments with Hevea marcots have been successfully carried out, this method of propagation has made little headway. Probably because the developing of marcots is much more troublesome than budding. In marcotting Hevea, earth is applied to the selected branches to force them to form roots while they are still on the mother tree. Since unlike buddings, the marcot is not influenced by an entirely different stock, it is thought likely that it inherits all the characteristics of the mother tree.

In a recent issue of the *Bergcultures*, P. Ward, of the Tjibioek Estate, has a good word to say in favor of marcotting. On his estate he has a group of 36 marcots which were originally planted out in 1919 so that the trees are now 11 years old. At present the average height is 19 meters (meter= 39.37 inches); marcots have no tap root, but a well-developed system of lateral roots, which, it seems, give the trees sufficient support. With the exception of a single tree all the marcots have forked, some just above the ground, others at heights ranging to 80 cm. above the ground and have, therefore, formed multiple-stemmed trees. It is this tendency of the marcot to fork that Mr. Ward considers particularly advantageous, for in this way a single tree yields a much larger tapping surface than ordinary trees do. Thus he shows that in his marcots the single stem below the fork, the average girth is 112 cm., whereas the total circumference higher up where the trees have divided, averages 176 cm. In the case of one tree which had formed five stems the total circumference was 321 cm., or 2.7 times the average girth of the single stems. The difference in the circumference of the lower part of the stem and the upper stems of a marcot is therefore a great advantage, for if one hundred acres of marcots are planted, eventually it is found that a tapping surface has become available corresponding to that from 150 acres of budded or ordinary rubber trees.

The tapping results of these marcots are unusually good. Unfortunately separate records for these trees were not previously kept and yield figures are available only for the month of June, 1930. But in that month the 36 marcots yielded 23.08 kilos (kilo = 2.2 pounds) which works out at something like 1.4 pounds per tree per month.

Different Method of Rejuvenated Hevea

Rejuvenation of old Hevea areas was a subject widely discussed at the latest Planters' Congress held at Bandoeng. One planter reported that trees planted ten years ago to replace old trees had not yet reached the tapping stage in spite of the utmost care. It seemed to be a fairly general opinion that rejuvenation by replacing single undesirable trees with new material was a thankless task and that the only thing to do was to clear thoroughly an old or poor area and replant all over again with new material.

However, a contributor to the *Bergcultures* describes a method of rejuvenation that he initiated four years ago that appears to be giving satisfactory results at the present time.

In various parts of a fifteen-year-old plantation the worst trees were sawed off at about 15 cm. above the ground. From most of the stumps new shoots and suckers developed from the root collar. The suckers especially grew rapidly, and it was decided to bud them with approved material. Owing to lack of experienced coolies, however, only 20 per cent were successful. Nevertheless after one and one-half years the buddings had attained a circumference of 8 to 15 cm.; while some were 3.5 meters high. On the same estate the usual method of replacing old trees with seedlings and buddings had also been followed, but the plants were very backward as other planters had also found.

The writer further states that during the past wet season hundreds of young buddings including replacement material were attacked by *Phythophthora*, and a large percentage destroyed; but of the budded suckers described above not even one was attacked. This is ascribed to the more vigorous growth of these trees and also probably to the fact that they have a complete root system. The writer concludes by saying that he expects his trees obtained by the new method to become tappable at six years.

Red Root Mold

Planters should pay more attention to root diseases and to red root mold in particular, declares E. von Zboray in a lecture held at Rangkasbitoeng. He points out in the first place that it is extremely difficult to discover this mold because in many cases it exhibits no external symptoms, and trees appearing to be quite healthy, for no apparent reason, fall over.

While it is a fact that the disease does not at present constitute a menace, as does mildew, it is well for planters to be prepared. Mildew, points out von Zboray, is the most important disease at this moment, just as brown bast was ten years ago, and root mold is a chronic disease which may suddenly become acute. It is, therefore, necessary for planters to investigate since no definite remedy can be recommended. Up to the present the best results have been obtained by exposing the affected roots on all sides, for it has been proved that molds do not thrive on exposed roots. However, the last word has yet to be spoken in connection with the treatment of molds, and preparedness is the watchword at the present time.

N. E. I. Notes

The Netherlands Rubber Union's report, covering 1929, shows that the concern, which was formed to remill native rubber, handled 5,000 tons during the year. The account for the year closes with a loss of 364,448 guilders. In buying wet rubber for treatment the company met with difficulties in transporting it to the factories. Manufacture was seriously hampered by the inadequate equipment, resulting in high costs for upkeep so that the manufacturing costs became too high. The factory at Pontianak had to be closed, and it was not found feasible to reopen the one at Bandjermasin. It was decided to give up plans for modifying the factories, and only the most necessary changes will be made in the Palembang and Djambi factories, which alone are working now.

The Bemantoh Rubber Mij., Medan, has been formed with a capital of 2,000,000 guilders to plant and deal in rubber and other tropical crops in the Dutch East Indies.

Dr. J. G. J. A. Maas has resigned from his position with the Rubber Experiment Station and his place will be taken by A. van Gelder, director of the Government Rubber Enterprise.

Rubber Patents, Trade Marks and Designs

Machinery

United States

1,770,969.* **Insulated Wire Vulcanizer.** A combination of tubing machine and vulcanizer for producing continuously cured rubber insulated wire. G. L. Cherry, La Grange, Ill., assignor to Western Electric Co., Inc., New York, N. Y.

1,770,985.* **Insulated Wire Vulcanizer.** Combination of special wire insulating head with vulcanizer for continuous production of insulated wire. C. Kively, Oak Park, Ill., assignor to Western Electric Co., Inc., New York, N. Y.

1,771,166.* **Cementing Machine.** A device for applying cement to articles of fabric or fabric and rubber, such as tire patches, etc. M. E. Davis, Grand Rapids, Mich., assignor, by mesne assignments, to H. E. Moyses, Akron, O.

1,771,471.* **Inner Tube Skiver.** A power operated machine for skiving the ends of lengths of tubular stock preparatory to splicing the ends to form inner tubes for pneumatic tires. H. E. Waner and W. B. Freeman, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

1,771,496.* **Crude Rubber Cutter.** A block of rubber resting upon a horizontal platform is sliced by being pushed by a hydraulic plunger against a set of electrically heated knives. C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,771,803.* **Footwear Mold.** This relates to molds for press curing footwear having uppers of woven fabric or leather, and soles of rubber integrally united to the uppers by vulcanization. H. McGhee, Rushcutters Bay, N. S. W., Australia.

1,771,861.* **Making Tennis Balls.** Two semi-rigid halves of vulcanizable materials forming a relatively thin gas container are joined gas tight, and the expanding assemblage is then vulcanized. A. E. Penfold, Birmingham, England, assignor to Dunlop Tire & Rubber Corp., Buffalo, N. Y.

*Pictured in group illustration.

1,772,190.* **Tank Lining.** This provides a method of installing a rubber lining in a tank by vulcanizing the rubber to a sub-structure. A. B. Merrill, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,773,148.* **Dipped Goods Former.** This is adapted for the production of dipped articles such as balloons, finger cots, etc. It provides a means whereby glass and other suitable formers may be supported firmly and protected from breakage. Y. H. Kurkjian, Hawthorne, N. J., assignor to Carl J. Schmid, Inc., New York, N. Y.

1,773,364.* **Inner Tube Stripper.** A tube mandrel is guided in line with a pneumatic stripping nozzle, stripping rollers acting to roll back one end of the tube onto the end of the nozzle. The loop of the tube so turned back is inflated by air introduced through the nozzle to separate the two layers of tube while the mandrel is being forced through the nozzle. The tube is thus turned inside out during the stripping operation. A. R. Krause and A. C. Hirsch, assignors to Gillette Rubber Co., all of Eau Claire, Wis.

1,771,208. **Skiving Machine.** J. M. Cooke, Revere, assignor to N. W. Mathey, Lynn, both in Mass.

1,771,401. **Tire Spreader.** F. de Franco, assignor of one-half to G. Karnoupakis, both of Weirton, W. Va.

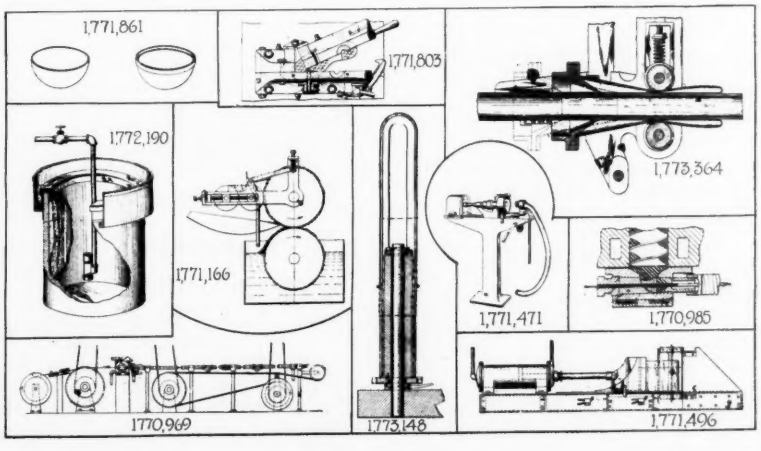
1,772,644. **Tire Vulcanizer.** F. E. Snyder, Santa Ana, Calif.

1,772,945. **Elastic Fabric Machine.** C. T. Hawley, Holden, Mass., assignor to Moore Fabric Co., Pawtucket, R. I.

1,772,956, 1,772,957, and 1,772,958. **Elastic Fabric Machine.** J. V. Moore, assignor to Moore Fabric Co., both of Pawtucket, R. I.

1,773,138. **Tube Molding Apparatus.** J. R. Gammeter, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,773,367 and 1,773,428. **Rubber Treating Machine.** R. C. Lewis, assignor, by mesne assignments, to Farrel-Birmingham Co., Inc., both of Ansonia, Conn.



Dominion of Canada

302,541. **Sectional Repair Bag.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of Morgan & Wright, assignee of G. K. McNeill, C. J. Dolding, and C. J. Smith, deceased, all of Detroit, Mich., U. S. A.

302,542, 302,543, 302,544, and 302,545. **Tire Casing Machine.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. O. Abbott, Jr., Detroit, Mich., U. S. A.

302,809. **Bias Cutter Safety Appliance.** Goodyear Tire & Rubber Co., Akron, O., assignee of L. Wetmore, Alameda, Calif., both in the U. S. A.

302,810. **Tubular Article Device.** Goodyear Tire & Rubber Co., assignee of W. C. State, both of Akron, O., U. S. A.

United Kingdom

329,570. **Mold Opener.** Goodyear Tire & Rubber Co., assignee of M. C. Nelson, both of Akron, O., U. S. A.

329,798. **Golf Ball Winder.** W. G. Morris and Morris Mfg. Co., Ltd., both of London.

330,049. **Tube Extruding Machine.** Dunlop Rubber Co., Ltd., London, and G. F. McCombe, Erdington, Birmingham.

330,365. **Ball Painting Machine.** Dunlop Rubber Co., Ltd., London, J. Wright and H. Trevaskis, of Dunlop Rubber Co., both of Foleshill, Coventry.

330,407. **Vulcanizer Head.** M. W. Mills, E. Ramsbottom, and J. F. Bolton, all of Heywood, Lancashire.

330,730. **Applying Tape to Uppers.** British United Shoe Machinery Co., Ltd., and G. Hazelton, both of Leicester.

Germany

504,914. **Rubberizing Apparatus.** Jagenberg-Werke A.G., Dusseldorf.

505,957. **Pressing Stamp.** L. and I. Dorogi and Dr. Dorogi & Co., Gummifabrik A.G., all of Budapest, Hungary. Represented by W. Fritze and E. Boas, both of Berlin S.W. 61.

505,958. **Stamp for Toy.** Magyar Ruggayntaarugyar Reszvenytarsasag, Budapest, Hungary. Represented by W. Fritze and E. Boas, both of Berlin S.W. 61.

505,961. **Conveyer Belt Vulcanizer.** Weidemann & Schroder, Berlin O. 17.

Designs

1,130,665. **Vulcanizing Mold.** P. A. de Weerth, Wuppertal-Elberfeld.

1,131,327. **Reclaiming Device.** G. Osselmann, Koln-Ehrenfeld.

1,131,328. **Solid Tire Cutter.** G. Osselmann, Koln-Ehrenfeld.

1,131,612. **Electrical Overshoe Vulcanizer.** F. Steuer, Saarbrucken 3.

1,132,016. **Tire Vulcanizer.** W. von der Heyde, Stade i. Hannover.

Process

United States

1,770,895. **Tire Building.** A. O. Abbott, Jr., assignor to Morgan & Wright, both of Detroit, Mich.

1,771,003. **Form Fitting Boot.** G. L. Van Dinter, assignor to Mishawaka Rubber & Woolen Mfg. Co., both of Mishawaka, Ind.

1,771,143. **Attaching Uppers to Soles.** A. P. Robinson and H. Kennell, both of Northampton, England.

1,771,502. **Channel Strip Material.** G. L. Matthias, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,771,506. **Chewing Gum Sandwich.** G. B. Mustin, Lansdowne, Pa.

1,771,981 and 1,771,982. **Chewing Gum.** G. B. Mustin, Lansdowne, Pa.

1,773,315. **Toy Balloon.** J. F. Mulholland, Columbus, O.

1,773,377. **Cored Rubber Heel.** C. Roberts, Winchester, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

Dominion of Canada

302,571. **Rubber Goods.** Hannon-Knight, Ltd., assignee of M. S. Hannon, both of Toronto, Ont.

United Kingdom

329,897. **Coagulating Latex.** Goodyear Tire & Rubber Co., assignee of B. W. Rowland, both of Akron, O., U. S. A.

330,006. **Connecting Uppers to Soles.** A. P. Robinson and Spenweld Shoe Inventions, Ltd., both of Northampton.

330,456. **Molding Rubber Carpet.** S. De Fraja and E. Minardi, both of Milan, Italy.

Germany

505,207. **Elastic Webbing.** Franz Clouth Rheinische Gummiwarenfabrik A.G., Koln-Nippes.

505,959. **Decorated Objects.** Vereinigte Gummiwaren-Fabriken Wimpassing vormals Menier-J. M. Reithoffer, Wimpassing, Austria. Represented by W. Zimmermann and E. Jourdan, both of Berlin S.W. 11.

Chemical

United States

1,771,785. **Rubber-Like Substance.** M. T. Harvey, New York, N. Y., assignor to Harvel Corp., a corp. of N. J.

1,772,218. **Seaweed Caoutchouc.** C. A. Houques-Fourcade, Bordeaux, France.

1,772,647. **Treatment of Latex.** M. C. Teague, Jackson Heights, N. Y., assignor to American Rubber Co., E. Cambridge, Mass.

1,772,752. **Treatment of Latex.** J. McGavack, Jackson Heights, N. Y., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,772,753. **Preservation of Latex.** J. McGavack, Jackson Heights, N. Y., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,773,101. **Impregnating Composition.** W. C. Geer, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,773,201. **Paper and Rubber.** R. P. Rose, Jackson Heights, and H. E. Cude, Floral Park, assignors to General Rubber Co., New York, all in N. Y.

1,773,379. **Antioxidant.** W. Scott, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

Dominion of Canada

302,540. **Aqueous Rubber Dispersions.** Dispersions Process, Inc., Dover, Del., assignee of W. B. Pratt, Wellesley, Mass., both in the U. S. A.

302,802. **Synthetic Rubber.** I. G. Farbenindustrie A.G., Frankfort a. Main, assignee of F. Hass and G. Niemann, both of Ludwigshafen a. Rhine, all in Germany.

302,811. **Rubber Cement.** Goodyear Tire & Rubber Co., assignee of C. M. Carson, both of Akron, O., U. S. A.

302,866. **Insulating Material.** Western Electric Co., New York, N. Y., assignee of A. R. Kemp, Westwood, N. J., both in the U. S. A.

302,995. **Accelerators.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. M. Cadwell, Leonia, N. J., and A. T. Maximoff, New York, N. Y., both in the U. S. A.

302,996. **Treatment of Latex.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. Hazell, New York, N. Y., U. S. A.

302,997. **Rubber Dispersions.** Dunlop Rubber Co., Ltd., Regent's Park, London, England, assignee of P. Klein, Budapest, Hungary, and A. Healey, Birmingham, England.

302,998. **Rubber Dispersions.** Dunlop Rubber Co., Ltd., London, N.W. 1, assignee of D. F. Twiss and R. G. James, both of Birmingham, all in England.

303,006. **Accelerator.** Faultless Rubber Co., assignee of T. W. Miller, both of Ashland, O., U. S. A.

United Kingdom

329,683. **Insulating Compositions.** Western Electric Co., Ltd., London. (Bell Telephone Laboratories, Inc., New York, N. Y., U. S. A.)

329,694. **Coating Compositions.** J. Y. Johnson, London. (I. G. Farbenindustrie A.G., Frankfort a. Main, Germany.)

329,761. **Coloring Rubber.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfort a. Main, Germany.)

329,953. **Plastic Compositions.** F. Hauptmeyer, Essen, Germany.

329,965. **Aqueous Rubber Emulsions.** Colas Products, Ltd., L. G. Gabriel, and J. F. Blott, all of London.

329,969. **Preserving Latex.** J. Y. Johnson, London. (I. G. Farbenindustrie A.G., Frankfort a. Main, Germany.)

329,981. **Insulators.** W. S. Smith, Newton Poppleford, Devon; H. J. Garnett, Lymne, Kent; H. C. Channon, South Kensington, London; and J. N. Dean, Orpington, Kent.

330,272. **Synthetic Rubber.** A. Carpmael, London. (I. G. Farbenindustrie A. G. Frankfort a Main, Germany.)

330,322. **Abrasive Compositions.** E. Garner, Pendleton, and Carborundum Co., Ltd., Trafford Park, both in Manchester.

330,520. **Latex Treatment.** Soc. Italiana Pirelli and U. Pest-Alozza, both of Milan, Italy.

330,536. **Latex Treatment.** Dunlop Rubber Co., Ltd., London, C. Hayes, E. W. Madge, and F. H. Lane, all of Fort Dunlop, Birmingham.

330,552. **Insulation.** British Insulated Cables, Ltd., and F. J. Brislee, Huyton, Lancashire.

Germany

504,922. **Filler.** M. Buchner, Hannover-Kleefeld and W. Bachmann, Seelze b. Hannover.

504,923. **Accelerators.** Rubber Service Laboratories Co., Akron, O., U. S. A. Represented by B. Kugelmann, Berlin S.W. 11.

505,172. **Treating Latex.** Naugatuck Chemical Co., Naugatuck, Conn., U. S. A. Represented by K. Michaelis, Berlin W. 50.

505,223. **Plasters.** Louis Ritz & Co., Hamburg.

505,824. **Covering Metals.** The Anode Rubber Co., Ltd., London, England. Represented by M. Wagner and G. Breitung, Berlin S.W. 11.

505,825. **Rubber Masses.** C. W. Leupold, Mannheim-Waldhof.

Austria

A 1691/92-29. **Products Simulating Rubber.** I. G. Farbenindustrie, A.G., Frankfurt a.M., Germany.

A 2324-28. **Artificial Sponge.** I. G. Farbenindustrie, A.G., Frankfurt a.M., Germany.

General

United States

1,770,938. **Steering Shock Absorber.** J. V. Martin, Garden City, N. Y.

1,771,004. **Boot.** G. L. Van Dinter, assignor to Mishawaka Rubber & Woolen Mfg. Co., both of Mishawaka, Ind.

1,771,078. **Rail Expansion Sound Deadener.** H. W. Herbst, Chicago, Ill., assignor, by mesne assignments, to Philip Carey Mfg. Co., a corporation of O.

1,771,079. **Rail Expansion Sound Deadener.** A. C. Fischer, Chicago, Ill., assignor to Philip Carey Mfg. Co., a corporation of O.

1,771,177 and 1,771,178. **Bathing Cap.** T. J. Howland, Long Branch, N. J.

1,771,277. **Boot.** G. L. Van Dinter and C. Ferrettie, assignors to Mishawaka Rubber & Woolen Mfg. Co., all of Mishawaka, Ind.

1,771,309. **Rubber Bumper Housing.** H. J. Pattison, Cleveland, assignor to Willys-Overland Co., Toledo, both in O.

1,771,640. **Portable Electric Lamp.** F. C. Kollath, Chicago, Ill.

1,771,726. **Overshoe.** K. L. Valentine and G. Ramsey, both of Jersey City, N. J.; E. M. Ramsey, executrix of G. Ramsey, deceased; assignors to Springem Overshoe Co., Inc., a corporation of N. J.

1,771,746. **Bootee.** J. W. Clifford, assignor to Goodyear's Metallic Rubber Shoe Co., both of Naugatuck, Conn.

1,771,749. **Brake Lining.** F. J. Eisenhardt, Waukegan, Ill., assignor, by mesne assignments, to Johns-Manville Corp., New York, N. Y.

1,771,793. **Resilient Heel.** B. Kind, Baltimore, Md.

1,771,838. **Babies' Bottle.** L. Bierbichler, Inchenhofen, Germany.

1,771,872. **Automobile Seat Cover.** F. C. Brock and I. L. Smith, both of Cleveland, O.

1,771,890. **Packing.** C. R. Hubbard, Newark, and R. M. Waples, Palmyra, assignors to Garlock Packing Co., Palmyra, all in N. Y.

1,771,963. **Tire Structure Filler Ring.** F. W. Krone, San Francisco, Calif.

1,772,107. **Tire Pop Valve.** N. S. Nelson, Pontiac, Mich., assignor, by mesne assignments, to Safety Tire Pop-Valve Co., a corporation of Mich.

1,772,138. **Tire Pressure Indicator.** J. H. Gartner, San Francisco, Calif., assignor of one-fifth to P. S. Higgins, one-fifth to J. D. Skelly, and one-fifth to W. Shackleton.

1,772,212. **Tire Inflator.** R. H. Daneel, Britstown, Union of South Africa.

1,772,339. **Babies' Bottle Protector.** M. J. Cole, Brooklyn, N. Y.

1,772,414. **Shock Absorber.** G. L. Brooke-Hunt and L. Rowland, both of Leicester, England.

1,772,439. **Trouble Lamp Bracket.** R. Garbs, Kankakee, Ill.

1,772,458. **Fabric.** H. I. Diamond, Atlanta, Ga.

1,772,495. **Resilient Coupling.** H. S. Powell, Utica, N. Y.

1,772,595. **Book Structure.** R. Trane, Omaha, Nebr.

1,772,608. **Fountain Pen.** F. J. Kristofek, assignor to Brown & Bigelow, both of St. Paul, Minn.

1,772,783. **Bedpan Air Cushion.** L. Sawyer, Denver, Colo.

1,772,912. **Flock-Coated Window Guide.** H. D. Randall, assignor to Randall Co., both of Cincinnati, O.

1,772,915. **Universal Joint.** H. M. Roseberg, Moline, Ill.

1,772,949. **Tire Pressure Indicator.** H. Jacoby, Eberstadt, Germany.

1,772,955. **Curvilinear Elastic Fabric.** J. V. Moore, assignor to Moore Fabric Co., both of Pawtucket, R. I.

1,772,969. **Menstruation Band.** N. Takeuchi, Takinogawa-Cho, Tokyo, Japan.

1,773,127. **Bathing Sandal.** L. Auster, New York, N. Y.

1,773,149. **Golf Ball Cleaner.** E. M. Laing, Highland Park, Ill.

1,773,215. **Tire Indicator Switch.** S. G. Bond, Wichita, Kan.

1,773,394. **Tire Deflation Signal.** W. L. Galbraith, Deer Park, assignor of one-fourth to O. M. Fahey, one-fourth to A. M. Baump, and one-fourth to A. H. Taylor, all of Spokane, all in Wash.

1,773,481. **Airplane Construction.** A. H. G. Fokker, Amsterdam, Netherlands, assignor to Atlantic Aircraft Corp., a corporation of N. J.

1,773,487 and 1,773,488. **Street Stop Signal.** W. A. Hines, assignor, by mesne assignments, to Standard Traffic Marker Co., both of Wichita, Kan.

1,773,505. **Tire Signal.** H. and F. Tastenhoye, both of Brussels, Belgium.

1,773,534. **Flexible Track Belt.** A. Kégresse, Levallois-Perret, France.

1,773,599. **Vehicle Suspension.** D. M. Pombo and O. B. Andrade, both of Buenos Aires, Argentina.

1,773,692. **Vehicle Body Mounting.** P. S. Shield, assignor to A. Davis, Jr., both of Cincinnati, O.

Dominion of Canada

302,469. **Electrical Phonograph Reproducer.** C. W. Peterson, Detroit, Mich., U. S. A.

302,480. **Tire.** K. Schragin, New York, N. Y., U. S. A.

302,486. **Buffing and Draw Gear.** A. Spencer, London, S. W. 1, England.

302,498. **Tire Inflator.** M. G. Zinsitz, Brookfield, Wis., U. S. A.

302,599. **Valve Seal.** Newport News Shipbuilding & Drydock Co., assignee of W. F. Grant, both of Newport News, Va., U. S. A.

302,618. **Inflating Coupling and Gage.** A. Schrader's Son, Inc., assignee of J. Wahl and O. Melzer, all of New York, N. Y., U. S. A.

302,619. **Pressure Gage.** A. Schrader's Son, Inc., assignee of J. Wahl and O. Melzer, all of New York, N. Y., U. S. A.

302,740. **Automobile Signal.** C. H. Turner, Rantoul, Kan., U. S. A.

302,750. **Electrolytic Cell.** Allen Electrolytic Cell Corp., assignee of H. I. Allen and D. B. Ayerst, all of Portland, Me., U. S. A.

302,838. **Pipe Coupler Insulation.** Roth Rubber Co., Chicago, assignee of W. W. Knight, Evanston, both in Ill., U. S. A.

302,852. **Resilient Structure.** La Société Belge du Caoutchouc-Mousse, Société Anonyme, assignee of M. Raepsaet, both of Berchem-Ste-Agathe, Belgium.

302,933. **Pneumatic Cushion.** A. V. Mellano, Thames Ditton, Surrey, England.

303,057. **Tire Valve.** C. S. Burton and G. S. Storey, administratrices of the estate of A. B. Shaw, deceased, assignees of one-third, and D. M., D. D., and E. Storey, each an assignee of one-ninth, all of Santa Monica, Calif., U. S. A.

303,064. **Tire Valve.** M. H. Henemier, New York, N. Y., assignee of F. J. Schmidt, Jersey City, N. J., both in the U. S. A.

303,261. **Tire Alarm Valve.** S. C. Taylor, assignee of fifty-one per cent of C. J. Mosher, both of Seattle, Wash., U. S. A.

United Kingdom

329,533. **Catamenial Appliance.** W. Neumann, Altona, Germany.

329,575. **Staircase Carpet.** W. Mainzer, London.

329,582. **Loudspeaker.** S. Schoenberg, Berlin, Germany.

329,729. **Buffer and Draw Gear.** G. Spencer Moulton & Co., Ltd., and R. T. Glascodine, both of Westminster.

329,746. **Tire Deflation Indicator.** D. McIntosh, Sunderland.

329,765. **Race-Horse Hoofpad.** A. V. Downie, Kensington, N. S. W., Australia.

329,779. **Tire Pressure Indicator.** H. Menz, Berlin, and W. Steffen, Hamburg, both in Germany.

329,784. **Telephone Instrument.** R. A. Yearsley, London.

329,813. **Tire Inflating Valve.** W. E. Copithorn, Natick, and L. H. Harris, Northampton, both in Mass., U. S. A.

329,870. **Buffer and Draw Gear.** A. Spencer, Westminster.

329,916. **Inflatable Boat.** G. Winkler, Berlin, Germany.

329,922. **Heel.** M. J. Jorgensen, Frederiksborg, Denmark.

329,955. **Tire.** E. B. Killen, London.

329,982. **Table Game.** A. E. Prebble, Hampshire.

330,065. **Brake.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., and W. L. Avery, of India Rubber, Gutta Percha & Telegraph Works, Silvertown, both in London.

330,078. **Pulleys.** J. Parker, Derby.

330,098. **Ball.** Kum-Bak Co., and J. J. Van Etten, both of Detroit, Mich., U. S. A.

330,150. **Automobile Hood Pad.** G. E. Wintz, Cincinnati, O., U. S. A.

330,151. **Color Photography.** Kodak, Ltd., London, assignee of H. E. Hastings, Rochester, N. Y., U. S. A.

330,191. **Heel Friction Pad.** S. Lucking, Chester.

330,195. **Brassiere.** L. E. J. Faithfull, London.

330,213. **Detachable Heel.** J. Beyer, Hamburg, Germany.

330,225. **Motorcycle Knee Grip.** D. Moseley & Sons, Ltd., and G. E. Bermingham, both of Manchester.

330,262. **Hair Waving Appliance.** G. Machin and J. Vaughan, both of London.

330,277. **Tire.** F. R. Castellvi, Niebla, Huelva, Spain.

330,282. **Tire.** Goodyear Tire & Rubber Co., Akron, assignee of R. E. Jenkinson, Stow, both in O., U. S. A.

330,325. **Sole.** H. Fairbrother, London. (Rubberhide Products, Ltd. Hobart, Tasmania.)

330,359. **Stropping Apparatus.** W. L. R. Amesbury, London.

330,399. **Road.** J. A. Ross, Burton-on-Trent.

330,411. **Gramophone.** Guinea Portable Gramophone Co., Ltd., London. (C. P. Madsen, New York, N. Y., U. S. A.)

330,413. **Scalp Brush.** W. A. Taylor, Detroit, Mich., U. S. A.

330,423. **Cycle Saddle.** J. B. Brooks & Co., Ltd., and B. Brooks, both of Birmingham.

330,432. **Mat.** G. J. Gunyon, Cheshire.

330,445. **Air Tube.** Goodyear Tire & Rubber Co., and G. E. Disney, both of Akron, O., U. S. A.

330,481. **Vehicle Tail Light.** M. T. Geyser, E. Elmhurst, N. Y., U. S. A.

330,542. **Drying Tubular Bodies.** S. Sokal, London. (Kalle & Co., Akt.-Ges., Biebrich-on-Rhine, Germany.)

330,566. **Air Cushion.** A. V. Mellano, Thames Ditton, Surrey.

330,573. **Electric Hair Brush.** J. Hallett, London.

330,601. **Mud Guard.** W. and T. Plant, (trading as Plant Bros.,) and H. Hanson, Normacot, all in Stoke-on-Trent.

330,664. **Electric Resistances.** E. Jones, Liverpool.

330,749. **Vehicle Mounting.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., and W. L. Avery, of India Rubber, Gutta Percha & Telegraph Works, Silvertown, both in London.

330,759. **Stamping Press.** W. A. Crabtree and G. W. Frakes, both of Yorkshire.

330,814. **Universal Joint.** Birmingham Small Arms Co., Ltd., and F. W. Hulse, both of Birmingham.

330,816. **Tire Deflation Indicator.** H. S. Christophersen, Odense, Denmark.

330,855. **Surgical Appliance.** J. A. Wilkins, Norfolk, Va., U. S. A.

Germany

505,626. **Heel.** O. Herfeld, Zurich, Switzerland. Represented by E. Moldenhauer, Dusseldorf.

505,753. **Closing for Felloes.** Societe Michelin & Cie., Clermont-Ferrand, Puy-de-Dome, France. Represented by H. Hillecke, Berlin S.W. 61.

Designs

1,130,118. **Winding Spool.** Anode Rubber Co., Ltd., London, England. Represented by W. Karsten and C. Wiegand, both of Berlin S.W. 11.

1,130,478. **Stair Covering.** F. Szepanski, Berlin N. 65.

1,130,506. **Flag with Balloon.** Elastic Gummi-Compagnie Riedl & Co., Frankfurt a.M.

1,130,507. **Umbrella with Balloon.** Elastic Gummi-Compagnie Riedl & Co., Frankfurt a.M.

1,130,590. **Accident Preventer.** S. Klaer, Frankfurt a.M.

1,130,639. **Water Cushion.** Schack & Pearson, Hamburg 11.

1,130,757. **Air Tube.** F. Boden, Braunschweig.

1,130,764. **Sponge Rubber Ball.** J. Hinz, N. Cohen, and F. Katz, all of Berlin.

1,130,774. **Inner Tube.** F. Boden, Braunschweig.

1,130,862. **Block Belt.** Continental Gummi-Werke A.G., Hannover.

1,130,959. **Mudguard Tire.** H. Hunecke and A. Brandt, both of Bremen.

1,131,120. **Sponge Rubber Toy.** H. Lindemann, Berlin S.W. 68.

1,131,254. **Sleeve Protector.** R. Heuser, Solingen-Merscheid.

1,131,368. **Belting of Webbing.** Vereinigte Gummiband-Webereien Tillmanns, Schniewind & Schmidt, Wuppertal-Elberfeld.

1,131,414. **Sponge Rupture Pad.** Masonia Rubber Works G.m.b.H., Wandsbek.

1,131,461. **Spray Hose.** G. Jacob, Zwickau i.Sa.

1,131,502. **Beret.** Munden-Hildesheimer Gummiwaren-Fabriken Gebr. Wetzell A.G., Hildesheim.

1,131,575. **Atomizer.** Firma Karl Dietrich, Leipzig.

1,131,803. **Swimming Appliance.** Harburger Gummiwaren Fabrik Phoenix A.G., Harburg-Wilhelmsburg.

1,131,804. **Swimming Tube.** Harburger Gummiwaren Fabrik Phoenix A. G., Harburg-Wilhelmsburg.

1,132,116. **Tire Cover.** T. and J. Bialek, both of Oberglogau, O.S.

1,132,238. **Floating Toy.** J. Kogl and A. Dobmeier, both of Ruhpolding, Oberbay.

1,132,372. **Inflatable Mattress.** Harburger Gummiwaren Fabrik Phoenix A.G., Harburg-Wilhelmsburg.

1,132,374. **Window Cleaner.** Continental Gummi-Werke A.G., Hannover.

Austria

A 5424-29. **Elastic Tire.** C. Daniel, Temesvar.

A 6233-28. **Ring and Pacifier.** Vulkan Gummiwarenfabrik Weiss & Baessler A.G., Leipzig-Lindenau, Germany.

Trade Marks

United States

273,066. Words: **"Federated Stores"** over letters: **"Q A S."** Tires and tubes. Gustin-Bacon Mfg. Co., Kansas City, Mo.

273,070. Sign containing word: **"Mitchell"** and representation of a tire containing letter: **"M."** Tires and tubes. Mitchell Tire & Tube Corp., Brooklyn, N. Y.

273,124. **Weatherall.** Rumble - seat weatherproof fabric protectors. Auto Rain Protection Co., Inc., New York, N. Y.

273,208. **Crusader.** Golf balls. Endicott Johnson Corp., Endicott, N. Y.

273,209. **Whiz.** Golf balls. Endicott Johnson Corp., Endicott, N. Y.

273,233. **Stamper Kraft.** Rubber faced stamp toys. Superior Type Co., Chicago, Ill.

273,271. Representation of a bird. Outer coats. Chicago Rubber Clothing Co., Racine, Wis.

273,280. Word: **"Ace"** right of representation of a spade containing letter: **"A."** Hard or soft rubber, solid, lined, or covered equipment for chemical process industrial uses. American Hard Rubber Co., New York, N. Y.

273,345. **India.** Batteries and battery boxes. India Tire & Rubber Co., Akron, O.

273,346. **Brampton.** Wearing apparel including raincoats and caps, bathing caps, corsets, footwear, etc. Franklin Simon & Co., Inc., New York, N. Y.

273,347. **Sports-Tan.** Wearing apparel including raincoats and caps, bathing caps, corsets, footwear, etc. Franklin Simon & Co., Inc., New York, N. Y.

273,348. **Tan-Mode.** Wearing apparel including raincoats and caps, bathing caps, corsets, footwear, etc. Franklin Simon & Co., Inc., New York, N. Y.

273,350. **Sure Seal.** Patches for inner tubes and inner lace boots and inner skive boots for auto tire casings. C. A. Weber, doing business as Web Auto Supply Co., Toledo, O.

273,384. Representation of a butterfly and words: **"Butterfly Baby Pants. Size . . . Color . . . Red Raven Rubber Co., Newark, N. J."** Baby pants. Red Raven Rubber Co., Newark, N. J.

273,393. **Paramax.** Tires, casings, and tubes. Pharis Tire & Rubber Co., Newark, N. J.

273,443. Rectangle containing words: **"Happy Dan."** Footwear. Endicott Johnson Corp., Endicott, N. Y.

273,474. Circle containing word: **"Walker."** Heels. L. Gatti, Brooklyn, N. Y.

273,478. Shield containing letter: **"S"** and below word: **"Service."** Heels and soles. Victor Products Corp., Gettysburg, Pa.

273,521. **Pacific Prince.** Golf balls. Pacific Golf Ball, Ltd., San Francisco, Calif.

273,590. Representation of a hide across which appears a rectangle containing words: **"Happy Dan,"** and words: **"Endicott Johnson America's Standard."** Footwear. Endicott Johnson Corp., Endicott, N. Y.

273,641. **Flexor.** Jars, cells, covers, vents, and separators for storage batteries. American Hard Rubber Co., New York, N. Y.

273,669. **Laymesh.** Rubber coated metal dippers, trays, pipes, and tubes. Henry K. Davies & Co., Inc., New York, N. Y.

273,687. **Navy.** Jars, cells, covers, vents, and separators for storage batteries. American Hard Rubber Co., New York, N. Y.

273,744. **Fleetwing.** Golf balls. Davega, Inc., New York, N. Y.

273,746. **Rug Anchor.** Rubber coated fabric to prevent rugs from slipping. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

273,866. **Downee Didee.** Diapers with rubber or rubberized linings. Downee Products Co., Sioux City, Iowa.

273,872. **Tropic Weld.** Tube patches. Tropic Weld, Inc., Minneapolis, Minn.

273,908. **Ever-Sweet.** Wash cloths. Deauville Specialty Corp., New York, N. Y.

273,931 and 273,960. Word: **"Ace"** right of representation of a spade containing letter: **"A."** Fans and tank cars. American Hard Rubber Co., New York, N. Y.

273,989. **Footline Footwear.** Footwear. Sears, Roebuck & Co., Chicago, Ill.

273,990. **Teeter Totter.** Footwear. Sears, Roebuck & Co., Chicago, Ill.

273,993. **Your Footprint in Leather!** Footwear. E. P. Reed & Co., Rochester, N. Y.

273,994. **Footprints.** Footwear. E. P. Reed & Co., Rochester, N. Y.

274,046. **Tanextra.** Shoes and soles. Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind.

274,058. Representation of a bulldog running with a canvas shoe in his mouth, and word: **"Skoots."** Footwear. Converse Rubber Co., Malden, Mass.

274,084. Word: **"Ace"** right of representation of a spade containing letter: **"A."** Hard or soft rubber, solid, lined, or covered equipment for chemical process industrial uses. American Hard Rubber Co., New York, N. Y.

274,167. **Little Gripper.** Footwear. Ground Gripper Shoe Co., Inc., Boston, Mass.

274,169. Circle containing representation of a tomahawk and word: **"Tomahawk."** Footwear. Servus Rubber Co., Rock Island, Ill.

Dominion of Canada

49,931. Representation of a shield containing words: **"Union Oil Company of Canada Ltd."** and letter: **"U."** Mineral rubber, rubber solvent, oils, greases, etc. Union Oil Co. of Canada, Ltd., Vancouver, B. C.

49,964. **Tensilastic.** Squeezing rolls. American Wringer Co., Inc., Woonsocket, R. I., U. S. A.

United Kingdom

504,892. **Macintosh.** Electric lighting fittings. Macintosh Cable Co., Ltd., London, N.W. 1.

510,437. Rectangle divided into six horizontal strips, the third from the top containing representation of a swan. Erasers, etc. Schwan Bleistift Fabrik Aktiengesellshaft, Nuremburg, Bavaria, Germany.

510,913. **Aquador.** Games and sporting goods not included in other than Class 49. Dr. Dorogi És Társa Gummigyár Részvéntársaság, Budapest-Albertfalva, Budapest, Hungary.

512,027. **Silvertown.** Machine and conveyer belting. India-Rubber, Gutta Percha & Telegraph Works Co., Ltd., London, E.C. 4.

512,029. **Pyramid.** Soles and heels. I. T. S. Rubber Co., Ltd., Petersfield, Hampshire.

512,420. **Plastex.** Linings for vessels, pipes, containers, etc. Sir S. W. Royse & Co., Ltd., Manchester.

512,542. **Velnor.** Rubber sponge substitutes. St. Albans Rubber Co., Ltd., London, E.C. 2.

513,076. **Kamplex.** Adhesive tape. Johnson & Johnson (Gt. Britain), Ltd., Slough, Buckinghamshire.

513,388. **Herculene.** Wire. W. T. Henley's Telegraph Works Co., Ltd., London, E.C. 1.

513,418. **Henco.** Golf balls. Henleys Tyre & Rubber Co., Ltd., London, E.C. 2.

513,585. **Winderby.** Tires. E. B. Killen, London, E.C. 4.

Prints

United States

12,682. **The White Walled Tire.** Tires. H. C. Hower, Chicago, Ill.

Designs

United States

81,438. **Combined Sole and Heel.** Term 14 years. C. Ferrettie and G. W. Blair, assignors to Mishawaka Rubber & Woolen Mfg. Co., all of Mishawaka, Ind.

81,441. **Bathing Cap.** Term 14 years. A. G. Greene, assignor to Revere Rubber Co., both of Providence, R. I.

81,592. **Tire.** Term 14 years. R. H. Nesmith, Grosse Pointe Park, assignor to Morgan & Wright, Detroit, both in Mich.

81,647. **Tire.** Term 14 years. H. C. Hower, Chicago, Ill.

81,719. **Tire.** Term 14 years. B. Omoto, Green River, Wyo.

81,752. **Tire.** Term 14 years. G. D. Kratz, Akron, and E. Schnedarek, assignor to Falls Rubber Co., both of Cuyahoga Falls, all in O.

81,780. **Water Float.** Term 7 years. C. E. Fox, assignor to Fox Toy Co., both of Berea, O.

81,807. **Sole.** Term 7 years. E. T. Packard, assignor to Avon Sole Co., both of Avon, Mass.

Dominion of Canada

8,803 and 8,807. **Tires.** Dominion Rubber Co., Ltd., Montreal, P. Q.

8,846. **Golf Ball.** India-Rubber, Gutta-Percha & Telegraph Works, Ltd., London, E.C. 4, England.

Labels

United States

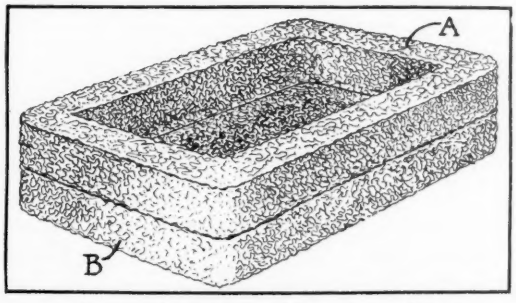
37,623. **Goodyear Weatherproof Company.** Raincoats. Goodyear Weatherproof Co., Cleveland, O.

37,830. **Bear Grip.** Tire patches. B. A. Hicks, San Diego, Calif.

SPONGE RUBBER SOAP DISH[1]

Improved Two-Piece Construction

THE familiar one-piece sponge rubber soap dish has recently been improved by making it of two pieces instead of one. The inventor was led to the new form of construction because of the desirability of introducing a structural reenforcement to overcome the softening effect of the constant action of soapy water on the texture of the sponge. This softening really makes the dish flabby so that it is not stiff enough to hold its shape well or to be handled when containing a cake of soap.



Improved Sponge Rubber Soap Dish

The improved reenforced construction is indicated in the illustration, which represents an upper portion or layer of sponge rubber cemented upon a lower layer serving as the base of the dish. The two layers *A* and *B* are preferably cut out of a large sheet of sponge rubber, and usually the soap cavity is cut after the two sheets have been properly cemented together. The reenforcing feature of this two-piece construction is due to the fact that the skin common to porous sponge rubber is allowed to remain upon the underside of the piece *A*. The presence of this skin between the parts of the dish affords a certain amount of stiffness or reenforcement, which is further increased by the layer of cement used for uniting the sponge rubber layers.

This two-piece construction is, therefore, of great strength having a reenforced element above the base around the center depression, and the container may be made of different colored material, be more attractive, and of greater utility.

[1] United States Patent No. 1,756,713, Apr. 29, 1930.

Official Rubber Goods Production Statistics

Rubber Tires and Tubes	1930 Mar.	1930 Apr.	1930 May	1930 June	1930 July	1929 June	1929 July	Per Cent Increase (+) or Decrease (—) July, 1930 from June, 1930	Per Cent Increase (+) or Decrease (—) July, 1930 from July, 1929	Cumulative Total from Jan. 1 Through July 31 1929	Cumulative Total from Jan. 1 Through July 31 1930	Per Cent Increase (+) or Decrease (—) Cumulative 1930 from 1929
Pneumatic tires:												
Production ..... thousands	3,891	4,518	4,574	4,098	3,193	5,478	4,856	—22.1	—34.2	38,221	27,508	—28.0
Stocks, end of month ..... thousands	10,010	10,461	10,745	10,622	9,449	13,468	11,872	—11.0	—20.4	.....	.....	.....
Shipments—												
Domestic ..... thousands	3,587	3,886	3,960	4,050	4,229	5,288	5,723	+ 4.4	—26.1	34,713	26,210	—24.5
Export ..... thousands	186	186	213	185	129	153	168	—30.3	—23.2	1,441	1,283	—11.0
Inner tubes:												
Production ..... thousands	3,953	4,408	4,428	3,960	3,151	5,234	4,634	—20.4	—32.0	36,904	27,292	—26.0
Stocks, end of month ..... thousands	10,543	11,028	11,082	10,889	9,326	14,056	12,249	—14.4	—23.9	.....	.....	.....
Shipments—												
Domestic ..... thousands	3,682	3,769	3,940	4,082	4,594	5,115	5,993	+12.5	—23.3	35,449	27,189	—23.7
Export ..... thousands	99	109	119	131	90	98	91	—31.3	— 1.1	942	781	—17.1
Solid and cushion:												
Production ..... thousands	19	17	17	17	13	40	39	—23.5	—66.7	256	130	—49.2
Stocks, end of month ..... thousands	123	117	108	107	101	133	129	— 5.6	—21.7	.....	.....	.....
Shipments—												
Domestic ..... thousands	22	23	23	18	19	38	39	+ 5.6	—51.3	256	144	—43.7
Export ..... thousands	2	2	1	2	1	3	2	—50.0	—50.0	17	12	—29.4
Other Rubber Products												
Rubber-proofed fabrics, production:												
Total ..... thous. of yds.	3,570	4,029	3,597	3,379	2,940	4,409	4,260	—13.0	—31.0	27,337	24,237	—11.3
Auto fabrics ..... thous. of yds.	727	1,368	1,239	851	608	1,199	1,188	—28.6	—48.8	6,598	6,644	+ 0.7
All other ..... thous. of yds.	1,211	1,071	1,205	1,042	917	1,262	1,208	—12.0	—24.1	8,814	7,423	—15.8
Raincoat fabrics ..... thous. of yds.	1,632	1,590	1,333	1,486	1,415	1,948	1,864	— 4.8	— 4.1	11,925	10,170	—14.7
Rubber heels:												
Production ..... thous. of pairs	15,439	17,762	15,603	15,795	15,117	20,007	19,315	— 4.3	—21.7	132,299	109,358	—17.3
Shipments—												
To shoe manufacturers .... thous. of pairs	8,458	9,201	7,432	10,287	11,668	12,262	13,785	—13.4	—15.4	81,488	66,872	—17.9
To repair trade ..... thous. of pairs	7,189	4,641	5,221	5,186	5,053	8,256	6,337	— 0.1	—20.3	50,174	38,907	—22.5
For export ..... thous. of pairs	956	1,096	776	829	938	926	794	—13.1	+18.1	7,556	6,675	—11.7
Stocks, end of month ..... thous. of pairs	36,546	37,618	38,595	38,852	35,524	44,581	44,243	— 8.8	—19.9	.....	.....	.....
Rubber soles:												
Production ..... thous. of pairs	2,582	2,593	1,939	2,734	2,663	2,502	1,295	— 2.6	+105.6	18,805	18,345	— 2.4
Shipments—												
To shoe manufacturers .... thous. of pairs	2,055	1,956	1,506	2,549	2,627	2,185	1,272	+ 3.1	+106.5	14,798	15,927	+ 7.6
To repair trade ..... thous. of pairs	407	380	332	309	364	522	163	+17.7	+123.1	4,264	2,675	—37.3
For export ..... thous. of pairs	54	28	27	31	34	17	70	+10.0	—52.0	356	368	+ 3.4
Stocks, end of month ..... thous. of pairs	3,349	3,272	3,019	3,307	2,876	3,843	2,895	—13.0	— 0.6	.....	.....	.....
Mechanical rubber goods:												
Shipments—												
Total ..... thous. of dolls	5,981	5,989	6,163	5,318	4,910	6,792	6,306	— 7.7	—22.1	46,502	38,906	—16.3
Belting ..... thous. of dolls	1,379	1,309	1,310	1,238	1,364	1,613	1,645	+10.2	—17.1	10,988	9,031	—17.8
Hose ..... thous. of dolls	2,500	2,593	2,703	2,199	1,856	2,658	2,355	—15.6	—21.2	17,768	16,075	— 9.5
All other ..... thous. of dolls	2,101	2,087	2,150	1,881	1,690	2,521	2,305	—10.2	—26.7	17,747	13,798	—22.3
Rubber bands, shipments ..... thous. of lbs.	248	197	211	177	174	187	192	— 1.7	— 9.4	1,562	1,463	— 6.3
Rubber flooring, shipments .... thous. of sq. ft.	533	570	615	634	.....	525	566	.....	.....	*3,307	*3,341	+ 1.0
Calendered rubber clothing:												
Production ..... no. coats and sundries	78,858	86,471	75,719	55,411	38,582	87,530	89,871	—30.4	—47.1	564,995	456,924	—19.1
Net orders ..... no. coats and sundries	97,612	89,862	110,520	21,249	28,767	98,444	60,921	+35.4	—52.8	435,517	419,216	— 3.7

*Cumulative through June 30.
Source: *Survey of Current Business*, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Tire Production Statistics

	High Pressure Pneumatic Casings — All Types: Inventory	All Types: Production	All Types: Total Shipments	Cord: Inventory	Cord: Production	Cord: Total Shipments
1928	10,217,708	58,457,873	55,721,937	3,580,576	19,302,218	19,351,380
1929	9,470,368	54,980,672	55,515,884	2,290,236	13,765,025	15,016,460
1930						
January	9,539,353	3,588,862	3,525,404	2,382,959	804,783	713,713
February	9,928,838	3,644,606	3,355,844	2,474,495	662,419	599,599
March	10,010,173	3,890,981	3,773,865	2,458,117	572,417	588,613
April	10,461,208	4,518,034	4,071,822	2,493,603	656,281	610,308
May	10,745,389	4,573,895	4,173,177	2,421,953	618,012	677,999
June	10,621,634	4,097,808	4,234,994	2,258,517	584,089	748,203
July	9,449,318	3,193,057	4,357,836	1,835,760	425,844	845,072

	Balloon Casings: Inventory	Balloon Casings: Production	Balloon Casings: Total Shipments	Solid and Cushion Tires: Inventory	Solid and Cushion Tires: Production	Solid and Cushion Tires: Total Shipments
1928	6,594,978	38,878,218	35,931,982	152,120	508,223	512,602
1929	7,160,127	41,128,577	40,377,781	122,200	409,344	427,779
1930						
January	7,139,154	2,779,864	2,805,740	126,784	25,049	21,476
February	7,436,247	2,975,922	2,750,324	127,793	22,302	21,005
March	7,535,468	3,311,978	3,177,634	123,179	19,329	23,951
April	7,951,317	3,854,540	3,454,171	116,595	17,335	24,232
May	8,323,436	3,955,883	3,495,178	108,055	16,752	24,426
June	8,363,087	3,513,719	3,486,791	106,589	16,612	19,613
July	7,613,558	2,767,213	3,512,764	100,930	12,893	20,545

	High Pressure Inner Tubes: Inventory	High Pressure Inner Tubes: Production	High Pressure Inner Tubes: Total Shipments	Balloon Inner Tubes: Inventory	Balloon Inner Tubes: Production	Balloon Inner Tubes: Total Shipments
1928	5,037,716	23,255,891	23,749,966	7,049,748	36,878,990	34,095,223
1929	3,339,451	16,100,281	17,718,806	6,889,213	38,921,749	38,719,177
1930						
January	3,233,813	783,709	889,208	6,911,422	2,898,682	2,992,752
February	3,243,130	675,126	680,989	7,171,395	3,030,745	2,786,578
March	3,137,472	619,416	696,161	7,392,794	3,331,739	3,082,456
April	3,144,558	678,152	674,032	7,871,181	3,728,177	3,202,261
May	2,983,388	683,236	769,463	8,098,115	3,745,131	3,289,384
June	2,781,524	641,508	914,909	8,107,920	3,318,464	3,297,573
July	2,098,130	634,751	1,252,806	7,227,472	2,516,356	3,431,376

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires: Cotton Fabric Pounds	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires: Crude Rubber Pounds	Consumption of Motor Gasoline (100%) Gallons
1928	222,243,398	600,423,401	13,633,452,000
1929	208,824,653	583,039,984	14,748,552,000
1930			
January	14,559,163	42,108,149	1,080,660,000
February	13,766,977	40,378,929	1,060,640,000
March	14,655,987	43,910,926	1,241,240,000
April	17,263,963	51,151,863	1,382,400,000
May	17,436,928	52,130,471	1,459,880,000
June	15,034,336	45,705,967	1,508,220,000
July	13,399,389	39,365,247	1,533,880,000

Rubber Manufacturers Association figures representing 75 per cent of the industry.

MARKET REVIEWS

Crude Rubber

RUBBER BULL POINTS

1. Replacement demand for tires now held in abeyance should be released as soon as business recovery is assured.
2. Mildly optimistic view of business prospects for 1931 is held by automobile manufacturers.
3. Tire inventories in hands of manfacturers are at a low level.
4. Prices are and for a long time have been below the cost of production.
5. Disposition of automobile manufacturers to reduce prices to stimulate demand is augmented by introduction of new models.
6. Efforts are made at stabilization by a plan for a combination of American and other consumers who could control crude rubber production of the world.

RUBBER BEAR POINTS

1. Economic distress caused by failure of restriction agreements has caused the loss of millions of dollars and the bankruptcy of many companies.
2. World production is increasing and world consumption is decreasing; America's consumption, nearly 60 per cent of the world's rubber, has dropped more than 10 per cent.
3. Reduced schedules of almost 20 per cent have made it impossible for tire companies to reduce prices.
4. Unprecedentedly high stocks of rubber are on hand especially at London and Liverpool, where the total is now 116,904 tons.
5. Arrivals of rubber for August were 34,558 tons, and consumption only 30,575 tons.
6. Automobile production for August declined 12 per cent from July, 1930, and 53 per cent from August, 1929.
7. Production of crude rubber on estates of more than 100 acres in the Far East during August totaled 23,796 tons against 22,704 tons in July.
8. Stocks on estates on August 31 were 26,430 tons against 25,814 tons on July 30.
9. Dealers' stocks in the Far East (excluding Singapore and Penang) as of August 31 aggregated 15,775 tons as compared with holdings of 15,067 tons at the end of the previous month.

New York Exchange

THE disastrous effect of 8- to 9-cent rubber is becoming more evident every day, and the gloomy predictions of dealers and traders are a reflection of this condition. Bull and bear factors clearly show why the bears have the upper hand. The bullish points are little more than hopeful predictions and find little basis in fact. The bears seem to have all the facts and figures on their side, and it all amounts to this: tremendous stocks of crude rubber are on hand, and production is increasing while consumption is decreasing.

Automobile and tire manufacturers, who at first looked forward to a Fall revival in business, are now shifting the scene of business recovery over into 1931. The best the statisticians will offer is the assurance that the long term trend of rubber is upward, but they find nothing optimistic in the outlook for at least the next six months.

All of this has brought another "plan" to the fore for the stabilization of the industry, this time it is the control of crude rubber by the United States. George E. Anderson, of the *Herald Tribune*, in a long article on September 21 attempted to prove that a plan suggested by Edgar B. Davis would save plantations from failure.

"The plan of Mr. Davis, as generally understood, is that American and other chief consumers of the crude product shall form a combination of such strength that it can actually buy or otherwise obtain the control of a dominating part of the crude rubber production of the world's plantations."

The bleak prospect of an economic war with the immense loss of capital attendant upon a policy of the survival of the fittest may make such a plan necessary. At present, prices are unbearably low, but nothing seems imminent on the horizon that will prevent even lower prices.

Week ended August 30: The price of crude rubber again fell to 9½ cents in a week of dull trading, the close of which found traders evening up in the face of the triple holiday. Liquidation was absorbed by dealer brokers in anticipation of first notice day on September 3. Prices in London were also much lower with a large increase in stock on hand expected for the week.

The expected improvement in automobile production has not materialized, the rate being below that which prevailed just prior to the three weeks' suspension by Ford. Another large manufacturer of low-priced cars is preparing to introduce a new model so that production will suffer until the new product is introduced.

News from the Far East was meager. The Bank of America N. A. prepared a review of the rubber situation, stating:

"The present situation is due fundamentally to an increase of more than 143 per cent in world rubber production in the last ten years and to a gain of more than 34 per cent in output in 1929 alone. Conditions have been further aggravated in the last eight months by a sharp decline in consumption, because of the reduced activity of the automobile industry. In recent years, moreover, improvement in the quality of tires, lengthening their period of service, has tended to reduce to some extent the consumption of crude rubber in this form."

From its recent actions it appears that the market is headed for another slump. It would be foolish, however, to make any definite forecast because the present price is below the cost of production, and that fact alone would give a tone of uncertainty to the best intentioned of predictions.

Closing prices on August 29 on "No. 1 Standard" contract were:

Position	High	Low	Close	Yesterday's Close
Sept.	9.64	9.63	9.64/9.70	9.69/9.71
Oct.	....	....	9.74	9.80
Nov.	....	....	9.87	9.90
Dec.	....	....	10.14/10.10	10.00/10.07
Jan.	....	....	10.18	10.14
Feb.	....	....	10.31	10.28
Mar.	10.45	10.44	10.44/10.48	10.42/10.44
Apr.	....	....	10.54	10.55
May	....	....	10.64/10.68	10.67
June	....	....	10.75	10.85
July	....	....	10.90	11.04
Spot	....	....	9.75	9.75

Week ended September 6: Prices sagged to unprecedented low levels during the week under an accumulation of bearish news that could not be withstood. While traders have been expecting an easier market with prices sagging somewhat, not even the most pessimistic expected to see rubber at 8½ cents. In their present frame of mind, however, nothing will be impossible.

Rubber Exchange

Daily Futures—Smoked Sheets—Clearing House Prices—Cents Per Pound—"No. 1 Standard" Contracts

Positions 1930	August, 1930 25	26	27	28	29	30*	September, 1930 1*	2	3	4	5	6	8	9
Aug.	9.83	9.70	9.70	....	....	....	....	....	....	....	....	....	....	....
Sept.	9.83	9.70	9.70	9.69	9.64	....	....	9.50	9.20	9.18	8.92	8.40	8.10	8.00
Oct.	9.97	9.84	9.84	9.80	9.64	....	....	9.62	9.30	9.30	9.03	8.40	8.10	8.00
Nov.	10.11	9.98	9.97	9.90	9.87	....	....	9.73	9.40	9.41	9.13	8.50	8.20	8.10
Dec.	10.25	10.12	10.10	10.00	10.04	....	....	9.85	9.50	9.52	9.24	8.60	8.30	8.21
1931														
Jan.	10.39	10.27	10.26	10.14	10.18	....	....	9.98	9.64	9.68	9.39	8.76	8.45	8.36
Feb.	10.52	10.41	10.41	10.28	10.31	....	....	10.10	9.77	9.83	9.53	8.92	8.59	8.50
Mar.	10.65	10.55	10.56	10.42	10.44	....	....	10.22	9.90	9.99	9.68	9.08	8.73	8.65
Apr.	10.79	10.67	10.68	10.55	10.54	....	....	10.34	10.01	10.09	9.79	9.24	8.95	8.79
May	10.93	10.80	10.81	10.67	10.64	....	....	10.45	10.12	10.19	9.90	9.40	9.15	8.94
June	11.12	10.97	10.96	10.85	10.75	....	....	10.62	10.25	10.34	10.01	9.59	9.30	9.07
July	11.30	11.14	11.11	11.04	10.90	....	....	10.79	10.38	10.50	10.12	9.78	9.45	9.20
Aug.	....	....	....	....	....	....	....	10.95	10.50	10.65	10.23	9.94	9.60	9.32

* Holiday.

Positions 1930	September, 1930 10	11	12	13	15	16	17	18	19	20	22	23	24	25
Aug.	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sept.	8.00	8.25	8.10	8.00	8.00	8.05	8.06	8.06	7.95	7.87	7.86	7.76	7.76	7.66
Oct.	8.00	8.25	8.10	8.00	8.09	8.16	8.10	8.15	7.95	7.87	7.86	7.76	7.76	7.66
Nov.	8.10	8.36	8.20	8.12	8.17	8.27	8.22	8.25	8.05	7.97	7.96	7.85	7.83	7.77
Dec.	8.20	8.48	8.28	8.24	8.25	8.38	8.36	8.36	8.15	8.07	8.06	7.95	7.90	7.88
1931														
Jan.	8.34	8.62	8.42	8.34	8.45	8.56	8.55	8.55	8.30	8.21	8.20	8.09	8.06	8.01
Feb.	8.48	8.76	8.55	8.44	8.56	8.68	8.67	8.67	8.45	8.34	8.33	8.22	8.18	8.14
Mar.	8.62	8.90	8.68	8.55	8.67	8.80	8.78	8.78	8.60	8.47	8.46	8.36	8.30	8.27
Apr.	8.77	9.03	8.81	8.66	8.78	8.89	8.88	8.89	8.70	8.61	8.60	8.49	8.45	8.38
May	8.91	9.15	8.94	8.80	8.88	8.98	8.98	9.00	8.80	8.75	8.73	8.62	8.60	8.52
June	9.03	9.28	9.07	8.95	9.00	9.09	9.08	9.12	8.91	8.87	8.84	8.73	8.73	8.65
July	9.14	9.40	9.20	9.10	9.12	9.20	9.17	9.22	9.02	8.98	8.95	8.84	8.85	8.78
Aug.	9.30	9.50	9.32	9.20	9.24	9.32	9.35	9.40	9.18	9.10	9.10	9.00	8.98	8.92

An unfavorable piece of news started the week. Cables said that Malayan rubber shipments for August amounted to 47,802 tons, an increase of 6,455 tons over the 41,347 tons shipped during the previous month. This developed forced selling, hedging pressure, and commission house selling, which helped send the market downward. There was a pause in the middle of week, but the next day, under expectations for a substantial increase in the foreign stocks next week, September liquidation following the circulation of delivery notices, reports of larger and cheaper c. i. f. offerings, and unfavorable reports from consuming centers all combined to cause a fresh spell of weakness in crude rubber futures.

To cap the climax at the close of the week a cable was received reading that the Straits Settlement Government intended to allow economic conditions to take their course, and they would do nothing to help restriction efforts. Coming as it did on the top of all the previous bad news, this announcement demoralized the market, and closing prices were from 8.30 to 8.50 cents with nothing but gloom in sight for the moment.

The latter cable came just at the wrong time. As pointed out frequently, the majority of traders believed that nothing would come of the restriction movement, and if the cable had come at any other time, it would simply have been bad news out of the way. The psychological effect it had was not at all expected.

Before this week a few had hopes that prices would hold around 9 cents because of the fact that the cost of production exceeded this figure. Now it is impossible to find a trader who is willing to set a bottom price. Nothing is the limit.

The result of these prices will be to send all weak companies to the wall. The process will be similar to the performance of a serious operation on a weak patient without anesthetics. In the long run, however, the patient may be better off. Closing prices on September 6 on "No. 1 Standard" contract were:

Position	High	Low	Close	Yesterday's Close
Sept.	8.50	8.50	8.40	8.92
Oct.	....	....	8.40	9.03
Nov.	....	....	8.50	9.13
Dec.	8.75	8.70	8.60	9.24
Jan.	....	....	8.76	9.39
Feb.	....	....	8.92	9.53
Mar.	....	....	9.08	9.68
Apr.	....	....	9.24	9.79
May	9.50	9.40	9.40/9.45	9.90/9.92
June	....	....	9.59	10.01
July	9.78	9.78	9.78	10.12
Aug.	....	....	9.94	10.23
Spot	....	....	8.56	8.93

Week ended September 13: Reflecting the sentiment that is evident after a break such as the one experienced in the previous week, prices fell even lower during the current week. "A" contracts broke through 8 cents to reach 7.90 cents. The "No. 1" contract went as low as 8 cents where it closed the week.

Dunlop, one of the largest users and also one of the largest producers of rubber, issued statements opposing the restriction plans. The cost of rubber production on its plantations in August was estimated at less than 4 pence a pound. When new and approved areas come into tapping, a cost of less than 3 pence per pound is expected.

Planters in Ceylon, on the other hand, were not satisfied with the decision of the Governor of the Straits Settlement. In a cable received from Colombo by the Rubber Exchange of New York, was the following:

"Ceylon is profoundly disappointed at the breakdown of the negotiations for the restriction of production or exporting of rubber. The committee that was formed last month under the presidency of the senior government official to consider a scheme for such restriction met this afternoon and decided not to accept as final the cable of the Governor of the Straits Settlement declaring that economic laws must take their course and that no restriction was possible, and resolved to press further on the producing countries the desirabilities of some kind of government control of output. The meeting also considered the question of the reduction of the export duty on rubber and of railway freight rates."

These conflicting views recall the opinions that were current when restriction was first discussed. The majority of planters that were in favor of the idea were all owners of the smaller estates. The large plantation owners, together with the American producers, were in favor of the policy announced by the Governor of the Straits Settlements. The small producer will suffer without aid from the government, and the large producer is anxious that the number of producers be reduced. The stronger plantations are, naturally, in the most favorable position and will eventually benefit from the results of an economic house-cleaning. Prices at the close of September 13 on the "No. 1 Standard" contract were:

Position	High	Low	Close	Yesterday's Close
Sept.	....	....	8.00	8.10
Oct.	....	....	8.00	8.10
Nov.	....	....	8.12	8.20
Dec.	....	....	8.24	8.28/8.35
Jan.	....	....	8.34	8.42
Feb.	....	....	8.44	8.55
Mar.	8.60	8.60	8.55	8.68/8.72
Apr.	....	....	8.66	8.81
May	....	....	8.80/8.90	8.94
June	....	....	8.95	9.07
July	9.12	9.10	9.10	9.20
Aug.	....	....	9.20	9.32
Spot	....	....	8.06	8.12

Week ended September 20: With the exception of Friday, when hedge selling and liquidation weakened the market somewhat, the general tone was steady with not much change from the previous week. The statistics presented during the week continued to be bearish as were the discussions about the situation of the rubber industry.

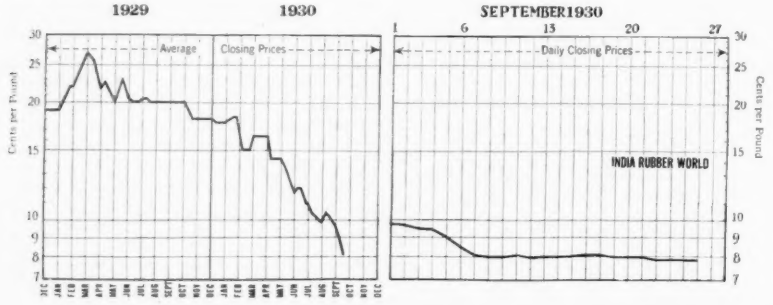
Another depressing feature is the large accumulation of stocks at London and Liverpool, with the total steadily increasing. Last week 114,029 tons of rubber

RUBBER EXCHANGE ACTIVITIES

Week Ended	Transactions: Contracts Sold: Number	Contracts Sold: Tons	Transferable Notices	Week-End Tone
Aug. 30..	1,003	2,507.5	71	Barely steady
Sept. 6..	1,211	3,027.5	127	Easier
Sept. 13..	2,405	6,012.5	218	Barely steady
Sept. 20..	1,078	2,690.0	126	Quiet and steady
Totals,	5,695	14,237.5	542*	

* Deliveries of actual rubber.

New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets



New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

	August, 1930						September, 1930														
	25	26	27	28	29	30*	1*	2	3	4	5	6	8	9	10	11	12	13	15	16	17	18	19	20
Ribbed Smoked Sheet	9 7/8	9 7/8	10	9 7/8	9 7/8	....	....	9 3/4	9 1/2	9 1/2	9	8 1/2	8 1/8	8	8	8 1/8	8	8	8	8 1/8	8 1/8	8 1/8	8	8
No. 1 Thin Latex Crepe	10 3/8	10 3/8	10 1/2	10 1/4	10 1/4	....	....	10 1/8	9 7/8	9 7/8	9 1/4	8 3/4	8 3/8	8 1/4	8 1/4	8 1/2	8 3/8	8 3/8	8 3/8	8 1/2	8 1/2	8 1/2	8 1/4	8 1/4
No. 1 Thick Latex Crepe	9 7/8	9 7/8	10	9 7/8	9 7/8	....	....	9 3/4	9 1/2	9 1/2	9	8 1/2	8 1/8	8	8	8 1/8	8	8	8	8 1/8	8 1/8	8 1/8	8	8
No. 1 Brown Crepe	9 3/8	9 3/8	9 1/2	9 3/8	9 3/8	....	....	9 1/4	9	9	8 5/8	8 1/8	7 3/4	7 5/8	7 5/8	7 3/4	7 5/8	7 5/8	7 5/8	7 3/4	7 3/4	7 3/4	7 5/8	7 5/8
No. 2 Brown Crepe	9 1/8	9 1/8	9 1/4	9 1/8	9 1/8	....	....	9	8 3/4	8 3/4	8 3/8	7 7/8	7 1/2	7 3/8	7 3/8	7 1/2	7 3/8	7 3/8	7 3/8	7 1/2	7 1/2	7 1/2	7 3/4	7 3/8
No. 2 Amber	9 3/8	9 3/8	9 1/2	9 1/4	9 1/4	....	....	9 1/4	8 7/8	8 7/8	8 5/8	8 1/8	7 3/4	7 5/8	7 5/8	7 7/8	7 3/4	7 3/4	7 3/4	7 7/8	7 7/8	7 7/8	7 5/8	7 5/8
No. 3 Amber	9 1/8	9 1/8	9 1/4	9	9	....	....	8 7/8	8 5/8	8 5/8	8 3/8	7 7/8	7 1/2	7 3/8	7 3/8	7 5/8	7 1/2	7 1/2	7 1/2	7 5/8	7 5/8	7 5/8	7 3/4	7 3/8
No. 4 Amber	8 5/8	8 5/8	8 3/4	8 1/2	8 1/2	....	....	8 1/2	8 1/4	8 1/4	8	7 1/2	7 1/4	7 1/8	7 1/8	7 1/4	7 1/4	7 1/4	7 1/4	7 3/8	7 3/8	7 3/8	7 1/8	7 1/8
Rolled Brown	8	8	8 1/8	8	8	....	....	7 7/8	7 5/8	7 5/8	7 1/2	7	7	6 7/8	6 7/8	7	6 7/8	6 7/8	6 7/8	7	7	7	6 3/4	6 3/4

*Holiday.

were on hand at the two centers, compared with 46,561 tons a year ago. For the week of September 20 another increase of over 2,000 tons is expected, and no let-up is in sight. Those plantations that have not been forced to close by the last severe break are tapping to the limit in an effort to reduce production costs. Thus, shipments to the United States for the weeks ended September 6 and 13 were 12,294 and 9,077 tons respectively. Ceylon shipments during August totaled 6,701 tons as compared with 4,070 tons in the previous month.

Automobile and tire figures show no improvement. The National Automobile Chamber of Commerce report for August indicated production of 240,100 vehicles in the United States and Canada, a decline of 12 per cent from July, 1930, and 53 per cent from August, 1929. The *Times* adjusted index of automobile production has fallen to 62.5, for the week ended September 13 as compared with 63.9 for the preceding week and 118.9 for the corresponding week last year. Excepting only the period when the Ford works were closed, the adjusted index is now at the lowest point yet reached in the current business depression.

Reports from the field hold out little encouragement for any immediate improvement in either sales or output for the industry as a whole, although here and there are indications of slightly better buying. Tire manufacturers, dependent as they are on the activity of the automobile industry, expect no improvement in their business until 1931.

H. Hentz & Co. in a report of September 18 comment on the long term prospects of automobiles and tires as follows: "The automobile industry is looking forward to greatly increased sales next year, and prominent executives in the tire industry now estimate that their tire production in 1931 will be five million more than the current year. Tire inventories in the hands of manufacturers have been reduced to a very low level so that any improvement in the automobile business, with its resultant demand for original equipment tires, would be reflected by increased activity in the tire centers. Such activity would naturally create a better demand for crude rubber and will probably come about during the balance of this year, when manufacturers are preparing for spring business, and during which time indications of curtailed production of rubber are likely to become evident." Prices at the close on September 20 on "No. 1 Standard" contract were:

Position	High	Low	Close	Yesterday's Close
Sept.	....	....	7.87	7.95
Oct.	....	....	7.87	7.95
Nov.	....	....	7.97	8.03
Dec.	8.10	8.10	8.07/8.10	8.15
Jan.	....	....	8.21	8.30
Feb.	....	....	8.34	8.45
Mar.	....	....	8.47/8.50	8.60
Apr.	....	....	8.61	8.70
May	....	....	8.75/8.80	8.80
June	....	....	8.87	8.91
July	....	....	8.98/9.04	9.02
Aug.	....	....	9.10	9.18
Spot	....	....	7.90	8.00

On September 22 the market in sympathy with other commodities was lower. Another large increase in foreign stocks contributed to the decline.

September 23 showed a slight falling off again in evidence, with London down another 1/8 pence. "A" contract reached 7.70 cents for September.

A London cable to the Rubber Exchange of New York on September 24 stated that owing to the uneconomical price of rubber, directors of the Anglo-Dutch Plantations of Java have given instructions to cease production on estates outside the original Pamenoeka and Tjiamsem lands.

On September 25 ribbed smoked sheets for October were 7.80 cents, and for July, 1931, they were 8.80 cents.

New York Outside Market

The "distress signal" is being raised almost everywhere that rubber is to be found. In England the loss to investors in British companies is estimated at more than half a billion dollars, with a strong probability that many more British rubber companies will cease to exist.

Tire companies in the United States are also finding it hard going. In spite of the drop in the price of rubber, it is not expected that any reduction will be made in the retail price of tires. The reason is that reduced schedules are so costly to the companies that the drop in crude rubber will make little difference in the

New York Quotations

Following are the New York outside market rubber quotations for one year ago, one month ago, and September 26, the current date

Plantation Hevea	September 26, 1929	August 26, 1930	September 26, 1930
Rubber latex (Hevea)...*gal.*	$1.50 @	$1.00 @	$0.75 @$0.90
Sheet			
Ribbed, smoked, spot	.20⅛@.20¼	.09¾@.09⅞	.07⅞@
September	.20⅛@.20¼	.09¾@.09⅞	.07⅞@
October-December	.20¾@.20⅞	.10 @.10⅛	.08⅛@
January-March	.21½@	.10¼@.10½	.08¼@
April-June	.21⅞@.22	.10½@.11	.08⅜@
CREPE			
No. 1 Thin latex (first latex) spot	.21⅛@.21¾	.10¼@	.08¼@
September	.21⅛@.21¼	.10¼@	.08¼@
October-December	.21⅝@.21¾	.10½@	.08½@
January-March	.22 @.22½	.10¾@	.08¾@
April-June	.22¾@.23	.11 @	.09 @
No. 2 Amber, spot ("E" blanket)	.17½@.17¾	.09⅛@	.07½@
September	.17½@.17¾	.09⅛@	.07½@
October-December	.17⅞@.18	.09⅜@	.07½@
January-March	.18 @.18¼	.09⅝@	.07¾@
April-June	.18½@.19	.09⅞@	.08 @
No. 3 Amber, spot ("C" blanket)	.17¼@.17⅜	.08⅞@	.07¼@
No. 1 Brown, clean, light, thin	.17½@.17¾	.09⅛@	.07½@
No. 2 Brown, clean, thin	.17¼@.17½	.08⅞@	.07⅜@
Brown, roll	.12½@	.07⅞@	.07 @
East Indian			
PONTIANAK			
Banjermasin	.08 @.09	.07 @	.06 @
Pressed block	.15 @.16	.12 @.12½	.12 @
Sarawak	@	.07 @	.06 @
South American			
PARAS			
Upriver, fine	.20½@	.12¼@	.11 @
Upriver, fine	*.25 @	*.16¾@	*.14¾@
Upriver, coarse	.10¾@	.06 @	.06¼@
Upriver, coarse	*.16½@	*.10½@	*.10 @

South American	September 26, 1929	August 26, 1930	September 26, 1930
PARAS—*Continued*			
Islands, fine	$0.18¾@	$0.13 @	$0.10½@
Islands, fine	*.24¾@	*.16½@	*.14½@
Acre, Bolivian, fine	.20¾@	.12½@	.11¼@
Acre, Bolivian, fine	*.25¼@	*.17 @	*.15 @
Beni, Bolivian	.21 @	.12½¾	.11¼@
Madeira, fine	.20½@	.12¼@	.11 @
CAUCHO			
Upper caucho ball	.10¾@	.06 @	.06 @
Upper caucho ball	*.16½@	*.10½@	*.10¼@
Lower caucho ball	.10 @	.05½@	.05¾@
Maniçobas			
Ceará negro heads	†.20 @	@	@
Ceará scrap	†.12 @	@	@
Manicoba, 30% guaranteed	†.22 @	†.10 @	@
Mangabiera, thin sheet	†.22 @	†.14 @	@
Guayule			
Duro, washed and dried	.19 @	.15 @	.15 @
Ampar	.20½@	.16 @	.16 @
Gutta Percha			
Gutta Siak	†.19¾@	.12¾@.13½	.12¾@
Gutta Soh	@	.25 @.26	.25 @
Red Macassar	2.35 @	2.20 @2.95	2.00 @
Balata			
Block, Ciudad Bolivar	†.51 @	.36 @	.38 @
Colombia	†.49 @	.36 @.37	.33 @
Manaos block	.57 @.59	.40 @.41	.39 @
Surinam sheet	.54 @.56	.58 @.59	.58 @
Amber	.56 @.58	.61 @	.62 @

* Washed and dried crepe. Shipment from Brazil.
† Nominal.

final cost, because the raw product represents only a small part of the cost of manufacturing a tire.

Automobile manufacturers, in like circumstances, are having difficulty in finding reasons for optimism. Demand is little more than half what it was in the previous year. Buying, therefore, from the factories is limited, with the hand-to-mouth policy still the most popular course.

Prices are gradually drifting lower, with each new point of decline uncovering new weaknesses. The quotations have been below the cost of production for a long time now, but the future trend is still downward. The only possibility of a recovery lies in a greatly increased demand or the elimination, by economic action, of large production areas.

A British rubber grower remarked that, "In America the people must be letting their tires wear almost to canvas." It looks that way, and it is one reason for predictions of better activity in 1931.

Week ended August 30: The short week and the desire of most traders to get away early for the Labor Day week-end made a dull market. Dealers and professionals were evening up in preparation of the September notice day.

News from Akron was not encouraging, with the *Times* index showing a reduction of 6.2 points for the week. The reason for the drop was ascribed to the fact that an important manufacturer of low-priced cars was curtailing production preparatory to changing models. The adjusted index for the week of August 30 stood at 71.3 as contrasted with 77.5 for the previous week.

In commenting on this drop in the index figure the *Times* "raises the question as to what extent general business activity might improve without the aid of a sharp revival in the motor car industry, which has been a leading factor in the business revivals which have followed the three previous post-war business depressions.

". . . . it is obviously a serious question whether there can be any rapid improvement in industrial activity generally without the aid of a greater revival of automobile buying than now appears to be immediately in sight."

Closing prices on August 30 were:

Spot	Aug. 30	Month Ago	Year Ago
Crepe	10¼	11	21¼
Ribs	9⅞	10½	20¾
Upriver fine.	13¼	13¼	21¾

Week ended September 6: The opinion of a number of traders was justified during the week, but we doubt whether they had calculated on the drastic effects the result of their opinion would have.

Doubt as to the success of efforts at restriction in the Far East has been expressed in these columns almost from the time the first meetings were held. On Friday a late cable from the Far East said that the Government of the Straits Settlements was going to let economic conditions take their course, and it would not take any action in reference to restriction efforts.

The market had already slipped from 9.40 to 8.80, but in Saturday's short session, prices sagged from 30 to 60 points more and closed at from 8.30 to 8.50 cents.

RUBBER AFLOAT TO THE UNITED STATES

All figures in long tons

Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	Total
Aug. 30.....	5,796	1,043	1,662	..	8,501
Sept. 6.....	8,963	1,607	1,724	..	12,294
Sept. 13.....	5,879	1,177	2,001	20	9,077
Sept. 20.....	5,214	1,229	1,314	20	7,777

All other news was forced to the background, but none of it would have helped because it was the bearish background that precipitated matters. Malayan shipments were up for August; the weekly shipments were up again; imports for our country were about 7,000 tons more than consumption, and stocks in London and Liverpool promised further increases.

Closing prices on September 6 were:

Spot	Sept. 6	Month Ago	Year Ago
Crepe	8¾	10¾	21
Ribs	8½	10¼	20⅛
Upriver fine..	13	13	21¼

Week ended September 13: The market was quieter during this week, but prices continued to slide. When prices broke through 8 cents, there was evidence of speculative buying and some from manufacturers. London was extremely weak, with stocks expected to show a large increase again in that center. Many British companies are facing ruin at present prices. On Monday rubber was quoted at 3 7/16 pence a pound in London, the lowest quotation ever recorded in the history of rubber production.

In spite of the low cost of crude rubber it is unlikely that the reduction will be reflected in the price of tires. William O'Neil, president of the General Tire & Rubber Co., stated that "Reduced schedules of approximately 20 per cent have cost the tire companies in the one item of depreciation nearly as much as they will gain by this drop in the cost of crude rubber."

Automobile manufacturers were quoted as believing that the output of 1931 will exceed that of 1930 largely owing to replacements. Their statements, however, were only mildly optimistic, and all comparisons were made with 1928, not 1929.

Closing prices on September 13 were:

Spot	Sept. 13	Month Ago	Year Ago
Crepe	8⅜	10¾	21⅜
Ribs	8	9⅞	20⅛
Upriver fine.	12¾	13¼	21

Week ended September 20, 1930: Buying was very quiet for the week, showing that manufacturers are well stocked with the crude product. The market held rather steady, but it is felt that it would not show much strength in the face of adverse news.

At present a weeding-out process is going on. The weak plantations are being forced to the wall with each week adding to the quota. The inexorable laws of economics are taking their toll, and the medicine is proving fatal in scores of cases. Those holding on are tapping their trees to the utmost to reduce the cost of production, without realizing that every increase in world stocks makes the position of crude rubber more precarious. Efforts are already being made by the larger companies to eliminate some of the distress in the present crisis. Plans for combines and monopoly control are being advanced as essential, and present prices are decried as curbs to expansion and detriments to the future supply.

It is doubtful whether the full effect of the present price level has been felt. It is the opinion of some that when the acute state of affairs is felt, a better tone of prices should prevail. These are starvation prices, and the weekly news telling of new failures emphasizes the fact.

Gross September exports are estimated to be between 46,000 and 47,000 tons, as compared with 47,806 tons exported during August and 53,484 tons during September, 1929.

Stocks in London and Liverpool are estimated to show an increase of more than 2,000 tons for the week. Arrivals for August were almost 4,000 tons more than consumption.

Closing prices on September 20 were:

Spot	Sept. 20	Month Ago	Year Ago
Crepe	8¼	10⅜	21⅜
Ribs	8	9⅞	20⅜
Upriver fine.	12½	13¼	21

On September 22 the price of spot ribbed smoked sheets closed at 8 cents the same as on the two previous days. On the 23rd and 24th spot closed at 7⅞ cents. Ribbed smoked sheets were quoted on September 25 at 8 cents, up 1/8 from the price of the previous day. There is a steady moderate movement of rubber into consuming channels.

Consumption and Stocks

Consumption of crude rubber by United States manufacturers for August is estimated at 30,575 long tons by the Rubber Manufacturers Association in its monthly statistical compilation. This is an increase or 4.6 per cent over the July consumption of 29,245 long tons and compares with 38,274 long tons in August, 1929, and 42,927 long tons in August, 1928.

Imports of crude rubber into the United States during the month of August totaled 34,558 long tons as compared with 34,084 long tons in July, 38,292 long tons in August, 1929, and 29,805 long tons in August, 1928.

The R. M. A. estimates total domestic stocks of crude rubber on hand and in transit overland on August 31 at 158,178 long tons as compared with 152,001 long tons as of July 31 and 90,769 long tons as of August 31, 1929. Crude rubber afloat for United States ports is estimated at 61,168 long tons as against 58,326 long tons on July 31 and 49,423 long tons the same date a year ago.

Automobile Production

August production (factory sales) of motor vehicles in the United States, as reported to the Department of Commerce, was 223,029, of which 187,037 were passenger cars, 35,758 trucks, and 251 taxicabs, as compared with 262,363 passenger cars, trucks, and taxicabs in July, 498,628 in August, 1929, 461,298 in August, 1928, and 309,994 in August, 1927.

Rubber Scrap

THE demand for rubber scrap is steady, its movement being in moderate volume in conformity with the consuming demand to conserve reclaimers' stocks. The already low prices on all grades have been further reduced on inner tubes and certain of the tire qualities; otherwise the prices remain unchanged from a month ago.

The prices on all rubber scrap are exceedingly low in line with those of reclaim and represent exceptional values. As a matter of fact the low prices prevailing for scrap are effectually restricting collections by eliminating all profit for the collectors.

BOOTS AND SHOES. The demand for these qualities continue fair. The prices remain unchanged from last month and are too low for profit to the collectors; therefore they are not building up the reserve stock.

INNER TUBES. Trade in inner tubes is mildly active and prices easier. Compared with one month ago quotations on the various grades have been reduced as follows: No. 1 floating is down 5/8-cent; all other grades are each down 1/4-cent.

TIRES. A fair demand prevails for all grades of tire scrap. The prices are not sufficiently attractive to stimulate collection, and the material is somewhat scarce.

Black auto peelings and both grades of solid tire scrap are quoted unchanged from one month ago. Mixed auto tires with beads, also beadless, are 50 cents a ton lower; while auto tire carcass scrap is marked down $1 a ton.

MECHANICALS. All varieties of mechanical scrap are quoted unchanged from one month ago.

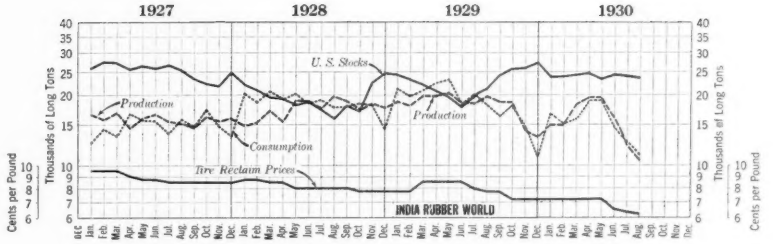
HARD RUBBER. No. 1 hard rubber is a standard quality in moderate and steady demand for conversion into dust. The price is quoted firm and unchanged.

CONSUMERS' BUYING PRICES

Carload Lots

Delivered Eastern Mills
September 26, 1930

	Prices
Boots and Shoes	
Boots and shoes, black..100 lb.	$1.10 @$1.15
Untrimmed arctics....100 lb.	.70 @ .80
Tennis shoes and soles..100 lb.	.60 @ .70
Inner Tubes	
No. 1, floating.....lb.	.06⅝@ .06⅞
No. 2, compound.....lb.	.02½@ .02⅝
Red .....lb.	.02½@ .02¾
Mixed tubes .....lb.	.02¼@ .02¾
Tires	
Pneumatic Standard	
Mixed auto tires with beads .....ton	12.50 @13.00
Beadless .....ton	15.50 @16.00
Auto tire carcass.....ton	21.00 @22.00
Black auto peelings....ton	20.00 @21.00
Solid	
Clean mixed truck....ton	24.50 @25.50
Light gravity .....ton	27.00 @29.00
Mechanicals	
Mixed black scrap.....lb.	.00¾@ .01
Hose, air brake.....ton	14.00 @16.00
Garden, rubber covered..lb.	.00½@ .00½
Steam and water, soft..lb.	.00½@ .00½
No. 1 red.....lb.	.02 @ .02¼
No. 2 red.....lb.	.01 @ .01½
White druggists' sundries..lb.	.02 @ .02½
Mechanical .....lb.	.01½@ .01¾
Hard Rubber	
No. 1 hard rubber.....lb.	.10 @ .10½



Production, Consumption, Stocks, and Prices of Tire Reclaim

Reclaimed Rubber

THE current quotations on every grade of reclaim is markedly lower than the prices named a month ago. These reductions are necessitated to offset the decline of crude.

Although reclaim because of its inherent characteristics is now acknowledged in the industry as an adjuvant to rubber rather than a substitute for it, the persistently low and declining prices prevailing for crude rubber not only depress reclaim prices in sympathy but cause a reduction in consumption ratio of reclaim to crude. This ratio has declined from the peak of 53.4 per cent in November, 1929, to 35.9 per cent in August of this year or essentially what it was in 1925 when smoked sheets advanced from 34½ in January to $1.22 in July and $1.10 in November of that year.

The fact that the ratio has declined but one-third by the competition caused by the disastrous fall of crude rubber prices is convincing evidence of the intrinsic technical value of reclaim.

Reclaimers have maintained production in close adjustment to consumption, and stocks have held practically constant since the first of this year. Production in August fell off 1,969 tons and consumption 1,689 tons.

One grade only, and that the quality of least value and importance, is quoted unchanged from a month ago. Pneumatic tire, shoe, and tube grades have been reduced from 6 to 8 per cent. Dark gray and white auto tire reclaim are marked down about 10 per cent, and No. 1 tube reclaim is down 13 per cent all from last month's quotations. Truck tire grades dropped but 4 per cent because of special demand and growing scarcity of the scrap supply.

New York Quotations

September 26, 1930

	Spec. Grav.	Price Per Pound
High Tensile		
Super-reclaim, black...	1.20	$0.08½@$0.08¾
red	1.20	.08¼@ .08½
Auto Tire		
Black	1.21	.05¾@ .06
Black selected tires....	1.18	.06 @ .06½
Dark gray	1.35	.07 @ .07½
White	1.40	.08¾@ .09
Shoe		
Unwashed	1.60	.06 @ .06¼
Washed	1.50	.08 @ .08¼
Tube		
No. 1	1.00	.08½@ .08¾
No. 2	1.10	.07½@ .07¾
Truck Tire		
Truck tire, heavy gravity	1.55	.06 @ .06¼
Truck tire, light gravity	1.40	.06¼@ .06½
Miscellaneous		
Mechanical blends.....	1.60	.05 @ .05½

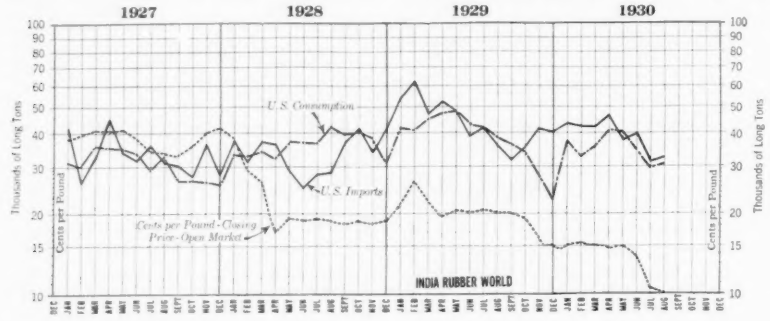
United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1929	219,057	224,253	47.9	27,464	12,721
1929					
January	18,685	21,068	49.1	24,394	941
February	18,094	19,829	47.7	23,305	1,028
March	19,984	20,068	46.7	22,076	1,344
April	19,899	21,574	47.3	20,680	1,498
May	20,385	23,176	47.1	19,479	1,299
June	18,416	18,141	42.0	17,980	961
July	18,387	20,236	48.7	19,679	1,202
August	19,787	18,230	47.6	22,309	860
September	18,660	16,416	47.2	24,984	657
October	18,968	18,024	51.8	25,474	830
November	14,363	14,742	53.4	26,080	1,232
December	13,429	11,089	47.1	27,464	869
1930					
January	15,010	16,785	45.8	24,241	954
February	15,847	14,918	45.5	24,241	1,203
March	17,400	15,616	43.2	24,415	1,048
April	17,828	17,321	43.0	24,592	740
May	17,812	17,473	43.7	23,356	939
June	15,745	14,410	41.6	24,484	641
July	12,320	12,688	42.3	23,870	778
August	10,361	10,999	35.9	23,610	807

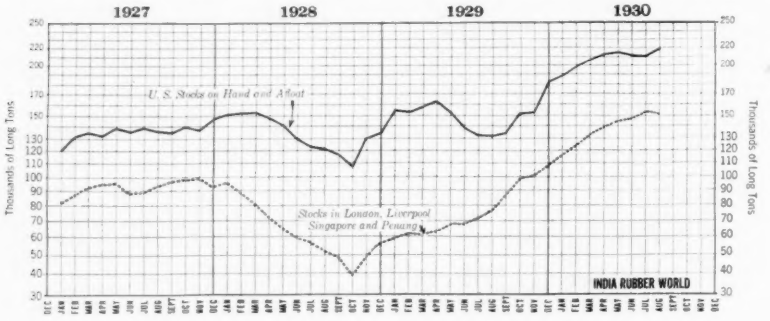
* Stocks on hand the last of the month or year.
Compiled by Rubber Manufacturers Association.

Imports, Consumption, and Stocks

RUBBER importations have exceeded consumption each month so far this year in amounts ranging from 8,647 tons in February to 1,068 tons in August, with the exception of May, when consumption exceeded importations 2,112 tons. April and May were the peak months of consumption this year as they were a year ago.



United States Imports, Consumption, and Prices of Ribbed Smoked Sheets



United States, British and Malayan Rubber Stocks

June and July consumption was characterized by two successive heavy reductions, the first somewhat greater than the second, bringing the rate about 4 per cent below the average monthly consumption in 1926. In August consumption increased sufficiently to equal the 1926 monthly average. On that basis we have the following comparisons by tonnage and percentages.

Year	Monthly Average Consumption, Tons	Comparisons by Percentage
1926	30,500	100
1927	31,083	102
1928	36,417	120
1929	38,470	125
1930 (8 mos.)	34,985	115

Imports have been increasing monthly since July and are expected to gain sharply in September.

Henderson Rubber Reports, Inc., estimates September imports at 35,500 tons and September consumption at 27,000 tons. The same authority estimates rubber afloat to the United States at 62,000 tons and stocks on hand in the United States at 164,000 tons. The price curve of spot rubber descended in August to 10 cents. Since then it dropped to about 7¾ cents.

London and Liverpool stocks follows:

LONDON STOCKS

Week Ended	Tons
Aug. 30	80,611
Sept. 6	81,830
Sept. 13	82,233
Sept. 20	82,648

LIVERPOOL STOCKS

Week Ended	Tons
Aug. 30	29,789
Sept. 6	31,159
Sept. 13	31,796
Sept. 20	34,085

United States Statistics of Rubber Imports, Consumption, and Stocks

Twelve Months	*Net Imports Tons	Consumption Tons	Stocks on Hand Tons	Stocks Afloat Tons	Total Domestic Stocks Tons	British and Malayan Stocks: London & Liverpool Tons	British and Malayan Stocks: Singapore & Penang Tons	British and Malayan Stocks: Total Tons
1925	385,596	388,000	50,985	52,421	103,406	6,328	18,840	25,168
1926	399,972	366,000	72,510	51,238	123,748	51,320	26,443	77,763
1927	403,472	373,000	100,130	47,938	148,068	66,261	25,798	92,059
1928	407,572	437,000	66,166	68,764	134,930	22,603	32,905	55,508
1929	527,327	464,644	105,138	62,389	167,527	73,253	35,548	108,801
1930								
January	44,093	36,669	126,068	61,863	187,931	81,300	33,468	114,768
February	41,373	32,726	134,790	63,404	198,194	87,100	37,550	124,650
March	42,339	35,914	141,843	63,646	205,489	93,500	38,129	131,629
April	46,997	40,207	148,272	63,261	211,533	99,870	39,880	139,750
May	37,790	39,902	146,179	68,168	214,347	102,936	41,253	144,189
June	39,761	34,643	151,551	58,658	210,209	108,203	39,033	147,236
July	30,970	29,245	152,001	58,326	210,327	108,704	44,535	153,239
August	31,643	30,575	158,604	61,168	219,772	112,989	38,590	151,579

*Including liquid latex, but not guayule.

United States Crude and Waste Rubber Imports for 1930 by Months

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Total 1930	Total 1929	Balata	Miscellaneous	Waste
January ..... tons	46,042	362	747	76	10	125	...	47,362	52,305	127	748	35
February	42,510	275	788	66	14	75	...	43,728	64,538	130	543	144
March	44,002	332	894	37	15	150	...	45,430	53,824	123	738	20
April	48,727	179	881	53	12	75	...	49,927	54,171	87	628	107
May	39,620	444	530	...	1	150	...	40,745	49,180	109	909	87
June	41,631	314	492	...	128	88	...	42,653	44,490	127	829	2
July	33,207	193	489	36	...	159	...	34,084	44,252	104	525	11
August	33,558	621	346	26	7	...	...	34,489	38,292	39	949	30
Total, eight months, 1930 ..... tons	329,297	2,720	5,167	294	187	822	...	338,487	.....	846	5,869	436
Total, eight months, 1929 ..... tons	*391,925	....	8,153	216	258	486	13	.....	401,051	675	8,861	2,064

*Latex included.

Compiled from Rubber Manufacturers Association statistics.

Compounding Ingredients

CONSUMING demand for all rubber compounding ingredients is adjusted to hand-to-mouth needs of the industry. Tire production schedules are met by working five days a week although some small plants are operating full time. Short time production is in effect in mechanical and other rubber goods plants. Overproduction and attendant price cutting have resulted in slowing up business and reducing profits. The manufacturers of specialized organic materials such as colors, accelerators, and antioxidants are less seriously affected in the present situation than those dealing in the ordinary run of compounding supplies.

ACCELERATORS. These specialized products have become so essential to economical and quality production that they find place in virtually every rubber mixing in all branches. The user's tendency is to select and standardize on as few accelerators as possible.

ANTIMONY SULPHIDE. The consumption of antimony sulphide has been reduced in some directions owing to the general curtailment conditions, but this decrease is largely offset by increased consumption in the manufacture of high quality compression type inner tubes.

ANTIOXIDANTS. The demand for antioxidants is well sustained and its volume is growing. They are being used in some of the cheapest rubber products because crude rubber is now entering their composition; therefore an age-resister becomes desirable.

CARBON BLACK. Production continues to exceed consumption; yet prices are firmer. The cut-rate quotations so general in August have disappeared because of two factors: (1) the small producers are fairly well sold up for the future, and (2) the probability of a merger of a considerable number of these small producers has had a marked effect. Demand is not large but is distinctly better than in July and somewhat better than in August. The best qualities continue to be quoted firmly at 4½ cents a pound f. o. b. Texas.

Unless a proper return can be made on the product, it is, of course, impossible to provide the safeguards which are now considered so essential. Consequently a very noticeable line of demarkation is appearing, and whereas some distress selling is taking place, quality comparison is becoming more marked.

CLAY. Clay is still being used but in lessening amounts. For at current prices for crude rubber there is less demand for second and third grade tires; consequently fewer are made, and less clay is called for.

FACTICE. Prices have declined with the lower markets for vegetable oils of domestic production, and also because of the advantageous position of rapeseed oil due to the new tariff regulations which permit denaturization and consequent saving of duty. Corn oil also has declined to a point permitting an adjustment of prices of factice grades based on this oil. It appears that advances are not likely for the next few months and for a longer period if the present price levels of vegetable oils are maintained.

LITHARGE. The demand is steady and featureless. Prices are steady.

LITHOPONE. Prices are firm and stabilized. Demand is steady.

SOFTENERS. The various softeners and stabilizers are in steady demand as essential to plasticising and curing.

VMP NAPHTHA. Business is reported steady on a replacement scale; while prices are firm and unchanged.

New York Quotations

September 26, 1930

Abrasives

Marble flour	ton	$20.00	@$25.00
Pumice stone, pwd	lb.	.02½	@ .04
Rottenstone, domestic	ton	23.50	@28.00
Rottenstone, English	lb.	.04	@ .05
Silica	lb.	.01¼	@ .05

Accelerators, Inorganic

Lead, carbonate	lb.	.07¾	@
red	lb.	.09	@
sublimed blue	lb.	.07	@
sublimed white	lb.	.07½	@
super-sublimed white	lb.	.07¼	@
Lime flour, hydrated	ton	20.00	@35.00
Litharge	lb.	.08	@
Magnesia, calcined, heavy	lb.	.04½	@
carbonate	lb.	.06	@ .07
Orange mineral A.A.A.	lb.	.11	@

Accelerators, Organic

A-1	lb.	.22	@ .27
A-5-10	lb.	.31	@ .36
A-7	lb.	.55	@ .65
A-11	lb.	.62	@ .75
A-16	lb.	.57	@ .65
A-19	lb.	.58	@ .75
A-32	lb.	.70	@ .75
Accelerator 49	lb.	.36	@ .41
Aldehyde ammonia	lb.	.65	@ .70
Barak	lb.		@
Butene	lb.		@
Captax	lb.		@
Crylene	lb.		@
paste	lb.		@
D. B. A.	lb.		@
D. O. T. G.	lb.	.42	@ .47
D. P. G.	lb.	.30	@ .35
Ethylidine aniline	lb.	.45	@ .47½
Formaldehyde aniline	lb.	.37½	@ .40
Heptene	lb.		@
base	lb.		@
Hexamethylenetramine	lb.	.58½	@ .61
Lead oleate, No. 999	lb.	.14½	@
Witco	lb.	.15	@
Lithex	lb.		@
Monex	lb.		@
Phenex	lb.	.70	@ .75
Pipsol	lb.	4.00	@ 4.50
Plastone	lb.		@
R-2	lb.	1.75	@ 2.15
base	lb.	4.50	@ 5.00
R & H 40	lb.	.40	@ .42½
50	lb.	.40	@ .42½
39	lb.	.75	@ .77½
Safex	lb.		@
S-P-D-X	lb.	.70	@ .75
Super-sulphur No. 1	lb.		@
No. 2	lb.		@
Tensilac 39	lb.	.40	@ .42½
Thermlo F	lb.		@
Thiocarbanilid	lb.	.26½	@ .28½
Trimene	lb.		@
base	lb.		@
Triphenyl guanidine	lb.	.58	@ .60
Tuads	lb.		@

Accelerators, Organic *(Continued)*

Ureka	lb.	$0.70	@$1.00
V. G. B.	lb.		@
Z. B. X.	lb.		@
Z-88-P	lb.	.50	@ .60
Zimate	lb.		@

Acids

Acetic 28% (bbls.)	100 lbs.	3.11	@ 3.36
glacial (carboys)	100 lbs.	11.51	@11.76
Sulphuric, 66°	ton	15.50	@

Alkalies

Caustic soda, 76% solid	100 lbs.	2.90	@

Antioxidants

Age-Rite, powder	lb.		@
resin	lb.		@
white	lb.		@
Albasan	lb.		@
Antox	lb.		@
Oxynone	lb.	.68	@ .90
Resistox	lb.	.54	@ .65
Stabilite	lb.	.57	@ .62
Alba	lb.	.70	@ .75
Zalba	lb.		@

Antisun Materials

Heliozone	lb.		@
Sunproof	lb.		@

Binders, Fibrous

Cotton flock, dark	lb.		@
dyed	lb.		@
white	lb.		@

Colors

BLACK

Bone	lb.	.08½	@
Carbon (see Reenforcers)			
Drop (bbls.)	lb.	.05½	@ .15
Lamphlack (commercial)	lb.	.07	@ .08

BLUE

Blue toners	lb.	.60	@ 3.85
Huber, brilliant	lb.	3.50	@ 4.00
Prussian	lb.	.35	@ .37
Ultramarine	lb.	.06	@ .30

BROWN

Huber, mocha	lb.	1.60	@ 2.10
Iron oxide	lb.	.03	@ .20
Mapico	lb.	.16	@
Sienna, Italian, raw	lb.	.05½	@ .12½

Colors *(Continued)*

GREEN

Chrome, light	lb.	$0.27	@$0.31
medium	lb.	.28	@ .31
Chromium oxide	lb.	.25	@
Green toners	lb.	1.00	@ 3.60
Huber, brilliant	lb.	3.75	@ 4.25

ORANGE

Cadmium sulphide	lb.	.90	@ 1.00
Huber, Persian	lb.	.50	@ 1.00
Orange toners	lb.	1.40	@ 1.60

ORCHID

Orchid toners	lb.	1.05	@ 1.70

PINK

Pink toners	lb.	1.00	@ 1.80

PURPLE

Purple toners	lb.	.60	@ 1.90

RED

Antimony			
Crimson, R. M. P. No. 3	lb.	.48	@
Sulphur free	lb.	.52	@
7-A	lb.	.35	@
Z-2	lb.	.42	@
Cadmium	lb.	1.15	@ 1.25
Huber, brilliant	lb.	1.35	@ 1.85
Iron Oxides			
bright pure domestic	lb.		@
bright pure English	lb.	.12	@
bright reduced English	lb.	.09	@
bright reduced domestic	lb.		@
Indian (maroon), pure domestic	lb.		@
Indian (maroon), pure English	lb.	.10	@
Indian (maroon), reduced English	lb.	.08	@
Indian (maroon), reduced domestic	lb.		@
Mapico	lb.	.09½	@
Oximony	lb.	.11¾	@
Red toners	lb.	.95	@ 2.75
Spanish red oxide	lb.	.03	@ .04
Sunburnt red	lb.	.14	@
Venetian red	lb.	.01¾	@ .03¾

WHITE

Lithopone	lb.	.05½	@ .05¾
Albalith	lb.	.05¼	@ .05½
Azolith	lb.	.05¼	@ .05¾
Cryptone	lb.	.07¼	@ .07½
Grasselli (50 lb. bags)	lb.	.05¼	@ .05¼
(400 lb. bbls.)	lb.	.05½	@ .05¾
Titanium oxide, pure	lb.	.20	@ .22
Titanox "B"	lb.	.07¼	@ .07¾
"C"	lb.	.07¾	@ .08¼

New York Quotations

September 26, 1930

Colors—(Continued)

WHITE—(Continued)

Zinc Oxide			
AAA (lead free) (bbls.)	lb.	$0.07	@
Azo (factory):			
ZZZ (lead free)	lb.	.06½	@ .07
ZZ (leaded)	lb.	.06¼	@ .06¾
Z (8% leaded)	lb.	.06¼	@ .06¾
Green seal	lb.	.10⅜	@ .10⅞
Kadox, black label	lb.	.10⅜	@ .10⅝
blue label	lb.	.09⅜	@ .09⅝
red label	lb.	.08	@ .08¼
Red seal	lb.	.09⅜	@ .09⅞
Special	lb.	.07	@ .07¼
White seal	lb.	.11⅝	@ .11⅞
XX green	lb.	.07	@ .07¼
XX red	lb.	.06½	@ .06¾
Zinc sulphide	lb.	.16	@ .16¼

YELLOW

Cadmium sulphide	lb.	.65	@ 1.40
Chrome	lb.	.17	@ .17¼
Huber, canary	lb.	2.80	@ 3.30
Mapico	lb.	.12	@
Ochre, domestic	lb.	.01⅝	@ .02⅝
French	lb.	.03	@
Oxide, pure	lb.	.09	@
Zinc, C. P., imported	lb.	.21	@

Factice—See Rubber Substitutes

Fillers for Pliability

Flex	lb.		@
Fumonex	lb.	.04	@ .08
P-33	lb.		@
Thermax	lb.		@
Velvetex	lb.	.03	@ .06

Fillers, Ordinary

Asbestine	ton	13.40	@13.50
Baryta white (f.o.b. St. Louis, bbls.)	ton	23.00	@
(f.o.b. St. Louis, paper bags)	ton	22.20	@
Barytes, white, spot	ton	30.00	@40.00
off color, spot	ton	20.00	@25.00
Foam "A" (f.o.b. St. Louis)	ton	23.00	@
Basofor	lb.	.04½	@
Blanc fixe, dry	lb.	.04½	@
pulp	ton	42.50	@45.00
Infusorial earth	ton	45.00	@50.00
Slate flour, gray (fact'y)	ton	7.00	@
Whiting			
Chalk, imported	100 lbs.	.95	@ 1.50
Domestic	100 lbs.	1.00	@
Paris White, English cliffstone	100 lbs.	1.50	@ 3.50
Quaker	ton		@
Sussex	ton		@
Witco (l. c. l.) (f.o.b. New York)	ton	20.00	@

Finishes

Mica, amber	lb.	.05	@
Shellac, fine orange	lb.	.60	@
Starch, corn, pwd	100 lbs.	3.77	@ 3.97
potato	lb.	.05½	@ .06
Talc, domestic	lb.	.01¼	@
dusting	lb.	.01¼	@ .04
French	ton	18.00	@22.00
Pyrax A	ton		@

Inflating Material

Ammonium carb., pwd.	lb.	.10½	@
lump	lb.	.10	@

Mineral Rubber

Fluxrite (solid)	lb.		@
Genasco (fact'y)	ton	40.00	@42.00
Gilsonite (fact'y)	ton	37.14	@39.65
Granulated M. R.	ton		@
Hydrocarbon, hard	ton		@

Mineral Rubber (Continued)

Ohmlac Kapak, M. R. (f.o.b. fact'y)	ton	$60.00	@
M. 4 (f.o.b. fact'y)	ton	175.00	@
Paradura (fact'y)	ton	62.50	@65.00
Parmr Grade 1	ton	28.00	@
Grade 2	ton	28.00	@
Pioneer, M. R., solid fact'y	ton	40.00	@42.00
M. R. granulated	ton	50.00	@52.00
Robertson, M. R., solid (fact'y)	ton	34.00	@80.00
M. R. granulated	ton	38.00	@80.00

Mold Lubricants

Rusco mold paste	lb.	.12	@ .30
Soapbark (cut)	lb.	.09	@ .10
Soapstone	ton	20.00	@25.00

Oils

Kerosene	gal.	.10	@
Mineral	gal.	.20	@
Poppy seed oil	gal.	1.70	@
Rapeseed	gal.		@
Red oil, distilled	lb.	.08⅞	@ .09⅜
Rubber process	gal.	.25	@
Spindle	gal.	.30	@

Reenforcers

Aluminum flake (sacks, c.l.)	ton	21.85	@
(sacks, l.c.l.)	ton	24.50	@
Carbon Black			
Aerfloted arrow	lb.	.05	@ .10
Century (works, La., c. l.)	100 lbs.	4.60	@
Disperso (works, La., c. l.)	100 lbs.	4.60	@
Excello	lb.	.05	@
Gastex (f. o. b. fact'y) contracts	lb.	.04	@
carload	lb.	.04	@
less carload	lb.	.05¼	@ .07½
Micronex	lb.	.05	@ .10
Ordinary (compressed or uncompressed)	lb.	.04½	@ .09
Palmer gas black	lb.	.04½	@
Supreme	lb.	.05	@
Clays			
Bento	lb.	.02½	@ .03
Blue Ridge, dark	ton		@
China	lb.	.01¼	@
Dixie	ton		@
Dusto	lb.	.05	@ .07
Langford	ton		@
Lexo (works)	ton	8.00	@
Par	ton		@
Perfection	ton	27.00	@
Suprex	ton	8.00	@20.00
Glue, high grade	lb.	.27	@ .35

Rubber Substitutes or Factice

Amberex	lb.	.15	@
Black	lb.	.08	@ .12
Brown	lb.	.07	@ .13
White	lb.	.09	@ .15

Softeners

Burgundy pitch	100 lbs.	6.00	@ 8.00
Atlas	100 lbs.	6.50	@
Corn oil, crude	lb.	.09	@
Cottonseed oil (P. S. Y.)	lb.		@
Cycline oil	lb.		@
Degras	lb.	.04	@ .04½
Fluxol	ton	18.00	@80.00
Fluxrite (fluid)	lb.		@
Palm oil (Lagos)	lb.	.05¾	@ .05¾
(Niger)	lb.	.05¼	@ .05⅜
(Witco)	lb.	.08½	@

Softeners (Continued)

Para-flux	gal.	$0.15	@$0.17
Petrolatum, snow white	lb.	.08	@ .08⅜
Pigmentar	gal.	.16	@ .21
Pigmentaroil (tank cars, factory)	gal.	.15	@
(bbls., drums)	gal.	.20	@
Pine oil, dest distilled	gal.	.50	@ .55
Pine pitch	bbl.	7.00	@
Pine tar (retort)	bbl.	13.50	@13.75
Rosin K (bbls.)	280 lbs.	5.95	@
Rosin oil, compounded	gal.	.36	@
No. 3, deodorized	gal.	.57	@
No. 556, deodorized	gal.	.48	@
Rubberseed, drums	lb.	.09½	@ .10
Rubtack	lb.	.10	@
Tackol	lb.	.09	@ .18
Tonox	lb.		@
Witco No. 20	gal.	.17	@
Woburn oil	lb.	.05½	@ .06
Wobonite No. 94	lb.	.03½	@

Solvents

Benzol (90% drums)	gal.	.26	@
Carbon bisulphide (drums)	lb.	.05½	@ .12
tetrachloride (drums)	lb.	.06½	@ .12
Dip-Sol	gal.	.12	@
Dryolene, No. 9	gal.	.09½	@
Gasoline			
No. 303			
Drums, c. l.	gal.	.20	@
Tank cars	gal.	.16	@
Rub-Sol	gal.	.07½	@
Solvent naphtha (tanks)	gal.	.28	@
Stod-Sol	gal.	.09	@
Turpentine, Venice	lb.	.20	@
dest distilled	gal.	.34	@

Stabilizers

Laurex, ton lots	lb.		@
Stearates			
Aluminum	lb.	.26	@ .27
Calcium	lb.	.26	@ .27
Magnesium	lb.	.28	@ .29
Zinc	lb.	.27	@ .28
Stearex	lb.	.13	@ .18
Stearic acid, dbl. press.	lb.	.16	@ .18

Vulcanizing Ingredients

Sulphur			
Rubber sulphur	100 lbs.	1.75	@ 2.25
Soft rubber (c.l.)	100 lbs.		@
(l.c.l.)	100 lbs.		@
Sulphur ch'oride	lb.	.03½	@ .04
Superfine commercial flour (bbls.)	100 lbs.	2.55	@ 3.10
(bags)	100 lbs.	2.20	@ 2.80
Tire brand, superfine,	100 lbs.	1.75	@
Tube brand, velvet	100 lbs.	2.30	@
Velvet flour (240 lb. bbls.)	100 lbs.	2.95	@ 3.50
(150 lb. bags)	100 lbs.	2.60	@ 3.15
Vandex	lb.		@
(See also Colors—Antimony)			

Waxes

Beeswax, white, commercial	lb.	.55	@
carnauba	lb.	.33	@
ceresin, white	lb.	.12½	@
montan	lb.	.06½	@
ozokerite, black	lb.	.28	@
green	lb.	.28	@
Paraffin			
122/124, crude, white scale	lb.	.03½	@
124/126 crude, white scale	lb.	.03¼	@
125/127 fully refined	lb.	.04¼	@

Miscellaneous Supplies

Bentonite (dispersion clay)	lb.	.02½	@ .03
Sponge paste	lb.	.30	@

Carbon Black Aids Insulation

Carbon is ordinarily a good conductor of electricity; yet mixed in the form of carbon black with crude rubber, it not only does not injure the insulating properties of a rubber compound but may even improve them as much as 50 per cent, besides imparting to the compound improved toughness, density, tear, and wearing resistance, imperviousness to light, etc. Up to 10 per cent of carbon black on the crude rubber (plus the rubber content of any reclaim used) may be incorporated to improve the dielectric strength, resistivity, and power factor of the compound. This is because carbon black absorbs traces of water and dissolved electrolytes.

Dunlop Acre-Yield Rising

Dunlop Malayan plantations in 1929 yielded an average of 416 pounds of rubber per acre at an f.o.b. Singapore cost of 5⅛ pence per pound, as compared with 312 pounds at 6½ pence in 1928, according to Sir Eric Geddes, chairman of the Dunlop Rubber Co. of Great Britain. He states that higher yields are expected even on old areas, and that new plantations in which the best bud-grafted stock has been set out will give about three times the crops of the old areas. With improved organization, production, and manufacture he believes that the company will make money in planting even if prices for raw rubber remain at a low level.

New York Quotations

September 26, 1930

Drills

38-inch	2.00-yard ..... yard	$0.12½@
40-inch	3.47-yard	.07¼@
50-inch	1.52-yard	.17¼@
52-inch	1.90-yard	.13¾@
52-inch	2.20-yard	.12 @
52-inch	1.85-yard	.14½@

Ducks

38-inch	2.00-yard D. F.. yard	.13½@
40-inch	1.45-yard S. F.....	.18½@
72-inch	1.05-yard D. F.....	.28½@
72-inch	16.66-ounce	.32 @
72-inch	17.21-ounce	.33½@

MECHANICAL

Hose and belting..... pound		.29 @

TENNIS

52-inch	1.35 yard..... yard	.20 @

Hollands

RED SEAL

36-inch	..... yard	.14 @
40-inch	.....	.15 @
50-inch	.....	.19½@

GOLD SEAL

40-inch, No. 72	..... yard	.18½@
40-inch, No. 80	.....	.19½@

Osnaburgs

40-inch	2.35-yard ..... yard	.11¼@
40-inch	2.48-yard	.10½@
40-inch	3.00-yard	.08⅞@
40-inch	10-oz. part waste...	.13 @
40-inch	7-oz.	.09⅝@
37-inch	2.42-yard	.10¾@

Raincoat Fabrics

COTTON

Bombazine 64 x 60..... yard		.10 @
Bombazine 60 x 48.....		.09 @
Plaids 60 x 48.....		.10 @
Plaids 48 x 48.....		.09 @
Surface prints 64 x 60.....		.11½@
Surface prints 60 x 48.....		.10½@
Print cloth, 38½-in., 60 x 48		.04¾@
Print cloth 38½-in., 64 x 60		.05¼@

Sheetings, 40-inch

48 x 48, 2.50-yard..... yard		.08¾@
48 x 48, 2.85-yard.....		.07⅝@
64 x 68, 3.15-yard.....		.08¾@
56 x 60, 3.60-yard.....		.07⅛@
44 x 48, 3.75-yard.....		.06½@
44 x 40, 4.25-yard.....		.05⅜@

Sheeting, 36-inch

48 x 48, 5.00-yard..... yard		.05 @
44 x 40, 6.15-yard.....		.04⅛@

Tire Fabrics

SQUARE WOVEN 17¼-ounce

Peeler, karded ..... pound		.38 @

BUILDER 23/11

Peeler, karded ..... pound		.38 @

BUILDER 10/5

Peeler, karded ..... pound		.35 @

CORD 23/5/3

Peeler, karded ..... pound		.38 @

CORD 23/4/3

Peeler, karded ..... pound		.40 @

CORD 23/3/3

Peeler, karded ..... pound		.42 @

CORD 15/3/5

Peeler, karded ..... pound		.36 @

CORD 13/3/3

Peeler, karded ..... pound		.35 @

LENO BREAKER

8-oz. Peeler, karded... pound		.38 @
10-oz. Peeler, karded.....		.38 @

CHAFER

9.5 oz. Peeler, karded.. pound		.40 @
12-oz. Peeler, karded.....		.39 @
14-oz. Peeler, karded.....		.38 @

Cotton and Fabrics

WHILE it would be foolhardy to attempt to call the turn in the course of cotton prices, certain factors are being emphasized which place cotton in a rather favorable condition.

COTTON BULL POINTS

1. Consumption is at lowest point in many years, and increased demand seems to be inevitable.
2. Extreme low prices are inducing spinners to purchase for future requirements.
3. Halt in decline of the wholesale commodity price index for August as maintained by the Bureau of Labor Statistics.
4. Consumption of foreign cotton for 1929-30 exceeded production, and the carryover of foreign growth decreased. The increase in American carryover may be called upon to fill the gap.
5. Indications of reduced acreage for next year.
6. Reduction of output in the Delta sections may alter government figures.
7. Sales of standard cloth for August were 107.6 per cent of production; shipments were 105.7 per cent of production; stocks on hand at the end of the month decreased 2.8 per cent; and unfilled orders gained 1.8 per cent.
8. Exports increased.

COTTON BEAR POINTS

1. The government forecast is 14,340,000 bales of cotton for this year.
2. August consumption with four exceptions was the smallest since the War.
3. Labor troubles exist in southern mills centering in the Danville, Va., section.
4. Lack of improvement is shown by English spinners and cloth manufacturers.
5. Stocks of cotton goods at mills continue at levels well above those of last year.
6. World consumption of American cotton in the season just passed, according to a recent report of the International Federation of Master Cotton Spinners, amounted to 13,023,000 bales, representing a decline of 13.5 per cent from the preceding year.
7. It is estimated that, with an increase of consumption to 14,000,000 bales in the current season, there is enough cotton for all probable needs.
8. Report by New York Cotton Exchange Service indicates that last season's Indian crop had been underestimated by possibly 1,750,000 bales.

The index of wholesale commodity prices maintained by the Bureau of Labor Statistics showed no change during August from the July level. It represents the first halt in the steady downward trend of wholesale prices since July, 1929. At that time the bureau's index stood at 98 or 14 full points above the level of 84 at which it now rests.

The price of 11 cents for October contracts in New York is the lowest since 1914 with the exception of a day or two near the end of the 1921 season when the world carryover was nearly 4,000,000 bales larger than this year. Harriss & Vose points out that this is a "price at which consumption has never failed to expand to new high records, and at which, the precedents indicate, a cut of 12 to 20 per cent in the acreage will be made next spring." These same brokers for the last five weeks have been urging spinners to follow a buying policy that will cover at least half of their prospective requirements for the next twelve to twenty-four months.

Another encouraging feature is the fact that large traders are buying spots as freely as ever, with less risk than usual, and at lower costs.

The heavy exports seem to indicate that foreign spinners are already taking advantage of low prices despite the unpromising outlook for foreign textile markets.

It is too early to make a definite forecast; but if the commodity price level continues its favorable action, experts agree that we may at last witness the long delayed business recovery.

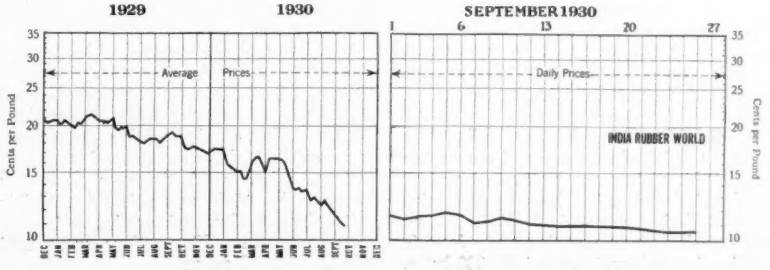
Week ended August 30: Cotton prices were irregular in a short range during the week with a pretty steady general trend. At the close, however, a flurry of active liquidation broke the price to 11.12-13 for new October. The amount of staple brought into the market thus far has been running far ahead of the figure a year ago.

The report of the New York Cotton Exchange put the amount of cotton brought into sight for the week ended yesterday, excluding linters, at 311,000 bales compared with 244,000 the previous week and 138,000 in the week last year. The movement so far this season has amounted to 765,000 bales against 453,000 last year.

The large amount of cotton coming into the market has been a bearish influence on prices, but private crop reports, which are coming in quite regularly, are bullish. Two were issued this week. One placed the indicated yield in Texas, Oklahoma, Louisiana, Arkansas, and Mississippi at about 408,000 bales below the official August 1 indication for these states. The other report made the condition of the crop as a whole 56 per cent of normal and put the indicated yield at only 13,940,000 bales.

Reports from Arkansas, Mississippi, southeast Missouri, and parts of north Alabama and west Tennessee are declaring that accurate estimates indicate that damage to staple and reduced production have cut the yield to 50 per cent of a normal crop, which is 20 to 25 per cent less than the average production of the last decade or so.

Daily Prices of Spot Middling Upland Cotton



The weather news was considered favorable with rain in Texas.

Liverpool cables reported a steady market due principally to the absence of hedging on a large scale. Prices at the close of August 29 were:

Position	High	Low	Close	Yesterday's Close
Oct.	11.60	11.37	11.37/38	11.65
Oct.	11.37	11.12	11.12/13	11.40/42
Dec.	11.72	11.50	11.50	11.78
Dec.	11.56	11.30	11.30/32	11.58/59
Jan.	11.78	11.58	11.58	11.89
Jan.	11.65	11.39	11.40/41	11.68
Mar.	11.82	11.54	11.54/55	11.83/84
May	11.98	11.72	11.72/73	12.01
July	12.12	11.85	11.85/88	12.16

Week ended September 6: The effect of August weather on the cotton crop was a chief topic during the week in an effort to anticipate what the government report on Monday would reveal.

Futures trading was largely influenced by forces evening up before publication of the report. The average estimate from ten private sources was 14,008,000 bales against 14,170,000 last month, with an average condition of 54.2 per cent of normal compared with 66.5 a month ago.

The movement of the crop to market continues heavy with a good market in spot cotton. Reason for accumulation of cotton by manufacturers may be found in the article by Dr. Haney in the *Textile World* on August 30.

"Cotton is cheap enough," he said. "There is danger in assuming that the present low consumption of cotton will continue for an indefinite period . . . and it is only a question of time before the demand for textiles will outrun the supply. . . . People who would not buy at under 11 cents may become eager purchasers as the price rises above 11 cents."

Prices at the close of September 6 follow:

Position	High	Low	Close	Yesterday's Close
Oct.	11.68	11.51	11.53	11.62
Oct.	11.44	11.25	11.30	11.39/40
Dec.	11.81	11.63	11.67	11.77
Dec.	11.59	11.43	11.47/49	11.57
Jan.	.....	.....	11.77	11.87
Jan.	11.69	11.53	11.55/57	11.66/67
Mar.	11.82	11.68	11.69/72	11.80
May	11.99	11.85	11.86/89	11.97/12
July	12.13	12.00	12.00	12.13/15

Week ended September 13: When the government crop report issued on September 8 showed a cut of only 22,000 bales from the August estimate, the price of cotton broke nearly ½-cent. The indicated yield was placed at 14,340,000 bales or about 300,000 bales above the average of recent private reports and brought in much liquidation of long contracts, which had been carried over the bureau in anticipation of lower figures. Sales were absorbed for the next two days on trade buying, but heavy liquidation from the South eased prices for the latter half of the week.

At Memphis much dissatisfaction was evident upon the release of the government report. It was felt here that the government figures were too high by 200,000 to 400,000 bales. A correspondent from the *Herald Tribune* traveled 200 miles into northeast Mississippi, as far down as the A. and M. College at Starkville, and is convinced the crop has been so sorely hit and is suffering so greatly from the second turnout of army worms that there is little likelihood that it will reach 1,450,000 bales.

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Aug. 30	11.60
Sept. 6	11.47
Sept. 13	11.20
Sept. 20	10.94

It has become evident that large spot traders, taking advantage of the extremely low prices, are buying spot cotton and carrying it for investment. As a result exports have run well ahead of last year, and the daily sales reported from southern markets are about paralleling those of a year ago when the demand was heavy. Prices at the close of September 13 were:

Position	High	Low	Close	Yesterday's Close
Oct.	10.98	10.92	10.94	10.97
Oct.	10.93	10.85	10.85	10.89/90
Dec.	11.17	11.09	11.11/15	11.13
Dec.	11.07	11.02	11.02/03	11.06/10
Jan.	11.22	11.18	11.19	11.18/20
Jan.	11.15	11.10	11.10	11.15/17
Mar.	11.32	11.25	11.25/26	11.31/33
May	11.50	11.43	11.43/45	11.50/51
July	11.64	11.60	11.60/61	11.66/67

Week ended September 20: The first October notice day, less than a week away, induced some near-month liquidation in the closing days of the week, chiefly by transfers to later positions. Trading was quiet on the whole, with narrow fluctuations, the spread between highs and lows having been barely 25 points.

Reports from Arkansas and Mississippi seem to indicate a change in the recent government figures. Actual ginning figures and statements of authorities who have evidence before them point to the shortest crop the Delta has had in fifteen years. Picking and ginning are progressing rapidly, but in a few sections the yield is so low that gins are running only part time. Reports from Arkansas and Alabama indicate unusually short fiber.

The State Extension Department of Alabama also reports that sales on the market are made very reluctantly because of low prices. All through the valley, banks and commission houses are, wherever possible, selling not more than one-half of their cotton and are holding the residue either by fresh loans or by trading in the futures market for higher prices on the presumption that next season the acreage must by compulsion be greatly reduced.

Prices at the close of September 20 were:

Position	High	Low	Close	Yesterday's Close
Oct.	10.83	10.78	10.81	10.85/88
Oct.	10.82	10.77	10.77/78	10.82/84
Dec.	11.06	11.00	11.03/05	11.06/07
Dec.	11.01	10.96	10.98	11.01/05
Jan.	11.13	11.10	11.12	11.17
Jan.	11.10	11.06	11.07	11.10
Mar.	11.28	11.22	11.26	11.27/30
May	11.46	11.40	11.41/42	11.47/48
July	11.63	11.58	11.60	11.61/64

September 22 saw established lowest cotton quotations for the season together with rubber, silk, and sugar. December closed at 10.85 compared with 10.89, the previous bottom. Increased hedging operations were continued from the close of last week.

On September 23 the new December contract slipped 8 more points to 10.77 in spite of aggressive trade buying and lower ginning figures. Fluctuations were held within 10 to 12 points.

Since the 22nd there has been a good volume of trading, and the market has recovered from the apathy that characterized it for some weeks. Trade and investment buying have limited fluctuations to a very narrow range. Spot middlings on the 25th were quoted at 10.55 cents and on the 26th at 10.50.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. In September prices had become a trifle firmer, although quotable advances were hardly in evidence. The demand was better, with more disposition to lay down contracts for future delivery during the remainder of the present calendar year. There were some inquiries for deliveries early in 1931.

Trading exhibits more confidence than one month ago and a growing interest in nearby and future requirements as cotton settles to substantially 11 cents a pound, while cotton textiles are still being traded in upon a basis of about one cent per pound less.

RAINCOAT FABRICS. The raincoat business is getting better each week and rubberizers are now operating full time. The best selling coats are Jersey, trench, leatherette and bright colors.

SHEETING. The sheeting market has been most active during the past month with some advances in prices. A good many numbers are becoming scarce for nearby delivery.

TIRE FABRICS. Conditions in the tire fabric market have been extremely dull the past month. Very little business has passed and no sizable inquiries appeared. Prices moved within very narrow limits in sympathy with like movements in raw cotton. Ordinarily with prices for cotton and fabric down so low one would expect buyers to purchase with confidence for delivery through the first half of next year. At this time of year they very often exhibit such an interest, but this year all interest seems to be lacking on the part of buyers, even at today's attractive price levels of tire fabric.

German-American Accelerators

The following accelerators regularly made for the American rubber industry are listed with their chemical names and those of the corresponding products as manufactured in Germany.

Du Pont Designation	Chemical Designation	I. G. F. Designation
Accelerator 552...	Piperidine Pentamethylene Dithiocarbamate	Vulkacit P.
Diphenylguanidine.	Diphenylguanidine.	Vulkacit D.
Accelerator 102...	Hexamethylenetetramine	Vulkacit H.
Thiocarbanilide ..	Thiocarbanilide ...	Vulkacit Ca.
Aldehyde ammonia	Aldehyde ammonia	Vulkacit A.

A HELPER WAS TAKING THE COVER OFF a mold with insecure tongs and the cover fell on his right finger and hand. It is estimated that he will be disabled for 35 days as the injury resulted in a possible fracture of the right finger and bones of the right hand. *Rubber Section News*, National Safety Council.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for August, 1930:

RUBBER EXPORTS

Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham.

To:	August, 1930 Rubber Including Concentrated Latex Tons	Latex and Revertex Tons
United Kingdom	11,930	27
United States	27,051	95
Continent of Europe	5,450	55
British possessions	379	1
Japan	2,734	2
Other countries	78	...
Totals	47,622	180
Total Latex and Revertex	180	
Grand total	47,802	

RUBBER IMPORTS

Actual Imports by Land and Sea

From:	August, 1930 Dry Rubber Tons	Wet Rubber Tons
Sumatra	534	3,886
Dutch Borneo	258	3,489
Java and other Dutch islands	206	50
Sarawak	722	18
British Borneo	201	15
Burma	30	3
Siam	124	176
French Indo-China	501	13
Other countries	74	4
Totals	2,650	7,654

Ceylon Rubber Exports

January 1 to June 30, 1930

To:	Tons
United Kingdom	7,744.75
Continent	3,452.40
Other countries in Europe	40.73
Australia	839.12
America	24,654.52
Canada and Newfoundland	2.50
Other countries in America	80.80
Egypt	7.00
Africa	3.94
India	51.02
Japan	196.74
Other countries in Asia	1.29
Total	37,074.81
For the same period last year	37,887.73

Annual Exports, 1922-1929

	Tons
For the year 1929	80,476.44
1928	57,825.48
1927	55,355.77
1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88
1922	47,367.14

Low and High New York Spot Prices

Plantations	1930*	September 1929	1928
Thin latex crepe	$0.08⅛ @ $0.10⅛	$0.20⅝ @ $0.21⅜	$0.18½ @ $0.19⅜
Smoked sheet, ribbed	.07⅞ @ .09¾	.19⅝ @ .20½	.17¾ @ .18¾
Paras			
Upriver, fine	.12 @ .13¼	.19¾ @ .21¾	.19 @ .20½
Upriver, coarse	.06½ @	.11 @ .11½	.13 @ .13¼
Upper caucho ball	.06 @	.11 @ .11½	.11¼ @ .13½

*Figured to September 26, 1930.

United States Rubber Statistics

	First Six Months 1928 Tons	1929 Tons	1930 Tons
Imports of rubber (sheets, lumps, etc.)	208,868	319,915	262,821
Imports of liquid latex	1,272	1,306	2,360
Imports of guayule	2,885	353	788
Gross Imports	213,025	321,574	265,969
Reexports	15,736	20,118	17,577
Retained	197,289	301,456	248,392

World Rubber Shipments—Net Exports

Long Tons

British Malaya	Calendar Years 1928	1929	1930 May	June	July	Aug.
Gross Exports	409,500	579,524	49,488	36,657	41,347	47,982
Imports	149,787	161,612	13,253	12,120	12,759	10,304
Net	259,713	417,912	36,235	24,537	28,588	37,678
Ceylon	57,271	80,795	5,968	4,152	4,619	6,779
India and Burma	10,790	11,720	975	778	792	†
Sarawak	10,087	11,079	917	1,040	1,087	740
British No. Borneo	6,698	7,381	*600	*500	*500	*500
Siam	4,813	5,024	382	392	327	300
Java and Madura	58,848	66,010	6,352	4,728	6,022	†
Sumatra E. Coast	82,511	87,589	6,661	4,776	5,891	†
Other N. E. Indies	121,671	134,732	11,916	9,512	9,770	†
French Indo-China	9,616	10,147	753	425	648	394
Amazon Valley	21,129	21,148	1,383	974	810	809
Other America	1,490	996	83	83	*75	†
Mexican Guayule	3,076	1,275	172	168	93	50
Africa	6,124	4,596	*300	*300	*250	†
Totals	653,837	860,404	72,697	52,365	59,472	.....

* Estimate. † Not available.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Absorption—Net Imports

Long Tons

Consumption	Calendar Years 1928	1929	1930 Apr.	May	June	July
United States	441,400	528,608	43,036	40,012	37,425	32,785
United Kingdom	48,504	122,675	13,058	9,862	9,645	7,650
Net Imports						
Australia	8,430	15,886	673	64	67	‡
Austria	3,043	3,324	337	274	423	‡
Belgium	7,958	9,445	1,431	1,254	691	939
Canada	30,447	35,453	2,303	2,593	2,579	3,347
Czechoslovakia	3,138	4,650	255	346	‡	‡
Denmark	566	799	105	21	129	80
Finland	768	976	57	96	56	99
France	36,498	59,342	5,006	5,233	4,458	‡
Germany	37,855	49,078	4,488	4,379	3,794	3,449
Italy	12,433	17,169	2,060	1,279	1,378	197
Japan	25,621	34,284	2,769	2,699	2,677	‡
Netherlands	2,243	3,022	158	230	343	172
Norway	728	813	91	57	58	30
Russia	15,134	12,626	949	1,677	1,454	‡
Spain	.....	2,400	*200	*200	*200	*200
Sweden	2,356	3,857	207	100	263	547
Switzerland	566	653	27	67	85	86
Others estimated†	8,000	.....	.....	.....	.....	.....
Grand totals	685,688	905,060	77,210	70,443	.....	.....
Minus United States	441,400	528,608	43,036	40,012	37,425	32,785
Total foreign	244,288	376,452	34,174	30,431	.....	.....

* Estimate to complete table. † Includes Argentina, Brazil, Chile, China, Cuba, Egypt, Estonia, Hungary, Latvia, Mexico, Poland, Portugal, Spain, and Union of South Africa. ‡ Not available.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Reported Rubber Stocks

Long Tons

Producing Centers	1930 Feb.	Mar.	Apr.	May	June	July
Singapore	32,074	32,629	34,005	33,302	31,486	31,783
Penang	5,476	5,500	5,575	5,272	4,467	5,106
Para	3,545	3,596	3,596	3,349	3,347	3,472
Totals	41,095	41,725	43,176	41,923	39,300	40,361
Manufacturing Centers						
London	64,557	68,923	74,676	77,312	80,260	81,048
Liverpool	20,605	21,098	23,849	25,415	27,332	28,291
Amsterdam	2,159	2,220	2,204	2,308	2,316	2,312
United States	139,657	146,624	150,199	151,049	155,000	158,445
Plantations afloat*	97,931	96,297	85,875	85,835	75,480	84,129
Totals	324,909	335,162	336,803	341,919	340,388	354,225
Grand totals	366,004	376,887	379,979	383,842	379,688	394,586

* W. H. Rickinson & Son, *The World's Rubber Position.*
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

London Stocks, July, 1930

London	Landed for July Tons	Delivered for July Tons	Stocks July 31 1930 Tons	1929 Tons	1928 Tons
Plantation	6,620	5,794	80,970	29,947	35,314
Other grades	12	15	*48	64	84
Liverpool					
Plantation	†2,058	†1,099	†28,291	†4,661	†2,389
Total tons, London and Liverpool	8,690	6,908	109,309	34,672	37,787

*Corrected. †Official returns from the recognized public warehouses.

United States Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	June 1 to June 17, 1930		January 1 to June 17, 1930	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*Free*				
Crude rubber	*49,365,293	$6,704,520	*552,912,589	$82,902,976
Jelutong or Pontianak	622,382	60,123	6,022,031	670,942
Balata	104,479	40,490	489,723	195,049
Gutta percha	101,278	16,649	113,210	19,831
Guayule	263,400	37,561	1,656,027	246,861
Siak, scrap and reclaimed	843,951	10,425	5,869,768	85,309
Totals	51,300,783	$6,869,768	567,063,348	$84,120,968
Chicle *Dutiable*	714,336	$380,779	8,733,245	$4,470,252
MANUFACTURED—*Dutiable*				
Belting	.....	.....	6,355	3,666
Tires *number*	25	218	3,480	57,367
Other rubber manufactures	.....	57,408	.....	685,100
Totals	.....	$57,626	.....	$746,133

EXPORTS OF FOREIGN MERCHANDISE

	June, 1930		Six Months Ended June, 1930	
	Pounds	Value	Pounds	Value
RUBBER AND MANUFACTURES				
Crude rubber	7,110,725	$1,028,653	39,484,442	$6,237,530
Balata	7,517	2,769	1,071,520	228,976
Gutta percha, rubber substitutes, and scrap	1,242	400	25,466	1,269
Rubber manufactures	.....	3,901	.....	121,255
Totals*	.....	$1,035,723	.....	$6,589,030

EXPORTS OF DOMESTIC MERCHANDISE

MANUFACTURED				
Reclaimed	1,436,724	$82,071	12,378,578	$753,660
Scrap and old	4,399,387	172,244	28,510,488	1,112,681
Rubberized automobile cloth *sq. yd.*	120,311	54,750	695,502	351,152
Other rubberized piece goods and hospital sheeting *sq. yd.*	95,188	40,443	844,375	326,508
Footwear				
Boots *pairs*	38,046	97,684	346,077	782,898
Shoes *pairs*	130,837	137,785	663,384	644,454
Canvas shoes with rubber soles *pairs*	330,603	211,838	2,541,249	1,710,574
Soles *doz. pairs*	7,328	18,722	64,906	179,074
Heels *doz. pairs*	84,104	54,665	643,706	419,324
Water bottles and fountain syringes *number*	15,499	7,295	173,092	91,172
Gloves *doz. pairs*	12,575	28,955	65,432	166,520
Other druggists' sundries	.....	28,052	.....	163,727
Balloons *gross*	45,095	49,269	364,859	374,107
Toys and balls	.....	9,357	.....	61,113
Bathing caps *doz.*	9,152	24,177	127,010	267,285
Bands	44,391	23,778	334,916	159,431
Erasers	35,616	23,210	271,423	166,617
Hard rubber goods				
Electrical goods	155,020	20,176	656,619	103,608
Other goods	.....	23,276	.....	206,141
Tires				
Truck and bus casings, *number*	27,354	653,389	223,338	5,133,983
Other automobile casings, *number*	175,227	1,464,538	1,135,541	9,917,934
Tubes, auto *number*	132,585	219,067	853,839	1,457,211
Other casings and tubes, *number*	6,233	20,814	43,072	137,895
Solid tires for automobiles and motor trucks *number*	17,808	54,758	31,455	473,707
Other solid tires	102,696	15,408	758,163	131,811
Tire accessories	.....	135,075	.....	696,905
Rubber and friction tape	109,082	28,445	765,637	209,752
Belting	420,118	215,685	2,548,576	1,301,949
Hose	629,093	188,239	4,439,520	1,487,457
Packing	168,184	60,199	1,053,468	470,529
Thread	110,213	108,068	889,906	867,499
Other rubber manufactures	.....	198,586	.....	1,425,302
Totals	.....	$4,470,018	.....	$31,751,980

*Liquid latex included.

Crude Rubber Imports by Customs Districts

Including latex, dry rubber content

	July, 1930		July, 1929	
	Pounds	Value	Pounds	Value
Vermont	.....	.....	2,000	$400
Massachusetts	1,975,928	$266,772	2,528,407	489,393
New York	65,676,697	8,844,708	75,494,722	14,979,746
Philadelphia	51,798	6,621	697,184	145,667
Maryland	1,804,014	215,542	2,555,039	473,411
Georgia	1,590,480	241,008	.....	.....
Los Angeles	7,338,125	941,318	10,319,990	1,965,617
San Francisco	132,942	18,975	127,660	24,037
Oregon	.....	.....	11,200	2,011
Ohio	444,218	54,817	7,344,445	1,392,502
Colorado	336,000	42,871	235,800	48,126
Totals	79,350,202	$10,632,632	99,316,447	$19,520,910

United Kingdom Statistics

IMPORTS

UNMANUFACTURED Crude Rubber From—	July, 1930		Seven Months Ended July, 1930	
	Pounds	Value	Pounds	Value
Straits Settlements	10,146,200	£266,431	105,972,100	£3,304,499
Federated Malay States	4,544,200	122,937	45,238,100	1,422,042
British India	928,900	23,308	9,443,800	293,176
Ceylon and Dependencies	1,947,500	50,525	19,663,800	606,564
Java and Dutch Borneo	3,089,600	85,571	20,201,700	631,491
Sumatra and other Dutch possessions in Indian Seas	1,768,200	52,292	13,855,700	446,259
Other countries in East Indies and Pacific, not elsewhere specified	264,200	7,074	2,009,000	63,901
Brazil	512,300	14,987	3,419,700	109,825
South and Central America (except Brazil)	.....	.....	122,200	3,719
West Africa				
French West and Equatorial Africa	131,800	3,114	278,600	7,883
Gold Coast	27,900	686	252,300	7,598
Other parts of West Africa	84,700	1,981	1,017,700	33,102
East Africa, including Madagascar	.....	.....	391,700	12,379
Other countries	319,400	9,152	1,726,300	56,942
Totals	23,764,900	£638,058	223,592,700	£6,999,380
Gutta percha and balata	212,300	12,063	2,804,300	208,751
Waste and reclaimed rubber	499,300	5,886	5,193,600	64,410
Rubber substitutes	11,500	263	102,900	2,121
Totals	24,488,000	£656,270	231,693,500	£7,274,662
MANUFACTURED				
*Tires and tubes				
Pneumatic				
Outer covers	.....	£47,122	.....	£216,057
Inner tubes	.....	5,970	.....	44,837
Solid tires	.....	4,831	.....	28,435
Boots and shoes *doz. pairs*	102,676	114,624	971,866	1,028,677
Other rubber manufactures	.....	144,578	.....	1,407,853
Totals	.....	£317,125	.....	£2,725,859

EXPORTS

UNMANUFACTURED				
Waste and reclaimed rubber	1,254,700	£11,332	13,266,400	£107,110
Rubber substitutes	37,800	823	307,900	6,621
Totals	1,292,500	£12,155	13,574,300	£113,731
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£381,662	.....	£2,530,641
Inner tubes	.....	63,867	.....	370,355
Solid tires	.....	8,472	.....	54,148
Boots and shoes *doz. pairs*	20,141	29,467	159,595	217,702
Other rubber manufactures	.....	244,652	.....	1,556,882
Totals	.....	£728,120	.....	£4,729,728

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED				
Crude Rubber				
To—				
Russia	.....	£.....	8,050,200	£305,052
Sweden, Norway, and Denmark	131,300	6,101	1,082,400	47,305
Germany	2,422,500	74,141	17,957,700	587,920
Belgium	786,400	24,554	4,875,600	170,952
France	2,257,300	70,152	14,856,100	535,438
Spain	105,000	5,369	506,100	23,516
Italy	120,400	4,121	2,583,000	87,367
Other European countries	490,900	17,553	2,528,600	106,137
United States	189,300	4,063	3,184,300	93,188
Other countries	125,200	5,376	888,200	40,846
Totals	6,628,300	£211,430	56,512,200	£1,997,721
Gutta percha and balata	56,600	4,641	405,600	34,728
Waste and reclaimed rubber	8,200	174	50,200	1,062
Rubber substitutes	.....	.....	1,500	30
Totals	6,693,100	£216,245	56,968,900	£2,033,541
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£9,379	.....	£38,082
Inner tubes	.....	715	.....	4,611
Solid tires	.....	81	.....	174
Boots and shoes *doz. pairs*	2,307	3,754	15,934	27,538
Other rubber manufactures	.....	6,850	.....	45,398
Totals	.....	£20,779	.....	£115,803

* Motor cars, motorcycles, parts, and accessories, liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts, and accessories were exempt from duty until April 30, 1926, inclusive, and rubber tires and tubes until April 11, 1927, inclusive.